

EXHIBIT 1

Westlaw

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W**Briefs and Other Related Documents**

TM Patents, L.P. v. International Business Machines Corp.S.D.N.Y.,2000.

United States District Court,S.D. New York.

TM PATENTS, L.P., and TM Creditors, L.L.C.,

Plaintiffs,

v.

INTERNATIONAL BUSINESS MACHINES CORPORATION, Defendant.

No. 97 CIV. 1929(CM) (MDF).

Nov. 13, 2000.

Assignee of patent for "wormhole" computer routing system sued competitor for infringement. On competitor's motion for summary judgment, the District Court, McMahon, J., held that: (1) inventor did not have title to invention, and thus assignee lacked standing to sue, and (2) patent was not infringed.

Motion granted.

West Headnotes

[1] Federal Civil Procedure 170A C=103.2**170A Federal Civil Procedure****170A1 Parties****170A1(A) In General****170Ak103.1 Standing****170Ak103.2 k. In General; Injury or Interest. Most Cited Cases**

Before federal court can consider merits of legal claims, person seeking to invoke jurisdiction of court must establish requisite standing to sue.

[2] Federal Civil Procedure 170A C=103.2**170A Federal Civil Procedure****170A1 Parties****170A1(A) In General****170Ak103.1 Standing****170Ak103.2 k. In General; Injury or Interest. Most Cited Cases**

Issue of plaintiff's standing remains open to review at all stages of litigation.

[3] Federal Civil Procedure 170A C=103.2**170A Federal Civil Procedure****170A1 Parties****170A1(A) In General****170Ak103.1 Standing****170Ak103.2 k. In General; Injury or Interest. Most Cited Cases****Federal Courts 170B C=12.1****170B Federal Courts****170B1 Jurisdiction and Powers in General****170B1(A) In General****170Bk12 Case or Controversy Requirement****170Bk12.1 k. In General. Most Cited****Cases**

Standing requirements drawn from Constitution look to whether plaintiff has made out case or controversy between himself and defendant within meaning of Article III; plaintiff can do this by showing he has "injury in fact," or "distinct and palpable injury." U.S.C.A. Const. Art. 3, § 2, cl. 1.

[4] Patents 291 C=286**291 Patents****291XII Infringement****291XII(C) Suits in Equity****291k286 k. Persons Entitled to Sue. Most****Cited Cases**

To bring suit for patent infringement, plaintiff must have legal title to or be exclusive licensee of patent in suit.

[5] Estoppel 156 C=68(2)**156 Estoppel****156111 Equitable Estoppel****156111(B) Grounds of Estoppel****156k68 Claim or Position in Judicial Proceedings****156k68(2) k. Claim Inconsistent with****Previous Claim or Position in General. Most Cited Cases**

Patent infringement defendant's admission during course of litigation that plaintiff had title to patent in suit, even after it became aware of possible cloud on plaintiff's title, did not estop it from challenging

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plaintiff's standing; there was no showing that defendant benefited from some prior judicial determination that plaintiff owned patent or that its admission was not result of good faith mistake.

[6] Estoppel 156 C=68(2)

[36] Estoppel

156III Equitable Estoppel

156III(B) Grounds of Estoppel

156k68 Claim or Position in Judicial Proceedings

156k68(2) k. Claim Inconsistent with Previous Claim or Position in General. Most Cited Cases

Theory of judicial estoppel may be invoked where (1) party against whom estoppel is asserted took inconsistent position in prior proceeding, and (2) that position was adopted by first tribunal in some manner.

[7] Federal Courts 170B C=731

170B Federal Courts

170B1 Jurisdiction and Powers in General

170B1(A) In General

170Bk29 Objections to Jurisdiction, Determination and Waiver

170Bk31 k. Waiver or Consent. Most Cited Cases

Defendant cannot create otherwise non-existent subject matter jurisdiction by admission.

[8] Patents 291 C=704

291 Patents

291X Title, Conveyances, and Contracts

291X(B) Assignments and Other Transfers

291k204 k. Transfer on Insolvency. Most Cited Cases

Bankruptcy court's order transferring debtor's interest in patent to creditor was not res judicata on issue of whether debtor had valid title to patent, even if competitor subsequently charged with infringement by creditor who purchased debtor's interest from bankruptcy estate had participated in debtor's bankruptcy proceedings; different issues were involved in bankruptcy and infringement proceedings, competitor had lacked standing to challenge debtor's title in bankruptcy proceeding and, in any event, could not have

known of title defect at time of bankruptcy proceeding.

[9] Judgment 228 C=713(2)

228 Judgment

228XIV Conclusiveness of Adjudication

228XIV(C) Matters Concluded

228k713 Scope and Extent of Estoppel in General

228k713(2) k. Matters Which Might Have Been Litigated. Most Cited Cases

Judgment 228 C=724

228 Judgment

228XIV Conclusiveness of Adjudication

228XIV(C) Matters Concluded

228k723 Essentials of Adjudication

228k724 k. In General. Most Cited Cases
 Final judgment of United States Bankruptcy Court is res judicata as to all matters properly before it that are necessary to that final judgment and that were or could have been litigated in proceeding.

[10] Judgment 228 C=720

228 Judgment

228XIV Conclusiveness of Adjudication

228XIV(C) Matters Concluded

228k716 Matters in Issue

228k720 k. Matters Actually Litigated and Determined. Most Cited Cases
 Under doctrine of "res judicata," also referred to "claim preclusion," subsequent action will be barred where claim between parties has been litigated and decided.

[11] Judgment 228 C=740

228 Judgment

228X(1) Merger and Bar of Causes of Action and Defenses

228X(1)(A) Judgments Operative as Bar

228k540 k. Nature and Requirements of Former Recovery as Bar in General. Most Cited Cases

In determining whether claim preclusion applies, court may consider whether (1) prior decision was fi-

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net judgment on merits; (2) litigants were same parties; (3) prior court was of competent jurisdiction; and (4) causes of action were same.

122 Bankruptcy 51 C=3568(2)

51 Bankruptcy
51XIV Reorganization
51XIV(B) The Plan
51k3566 Confirmation; Objections
51k3568 Effect
51k3568(2) k. Conclusiveness. Most Cited Cases

In determining res judicata effect of bankruptcy court judgment, court, in addition to normal considerations for applying claim preclusion, also asks whether independent judgment in separate proceeding would impair, destroy, challenge, or invalidate enforceability or effectiveness of reorganization plan.

113 Bankruptcy 51 C=2361

51 Bankruptcy
51IV Effect of Bankruptcy Relief; Injunction and Stay
51IV(A) In General
51k2361 k. In General. Most Cited Cases
 Filing of bankruptcy case does not, and cannot, give debtor or its creditors greater rights in property than debtor had prior to bankruptcy.

114 Bankruptcy 51 C=2044

51 Bankruptcy
51I In General
51I(C) Jurisdiction
51k2044 k. Jurisdiction Over Property. Most Cited Cases

Bankruptcy 51 C=3564(1)

51 Bankruptcy
51XIV Reorganization
51XIV(B) The Plan
51k3566 Confirmation; Objections
51k3568 Effect
51k3568(1) k. In General. Most Cited Cases

Bankruptcy court's jurisdiction does not extend to

property that is not part of debtor's estate, and even confirmed bankruptcy plan cannot furnish anyone rights to what was not property of debtor's estate.

118 Bankruptcy 51 C=3566.1

51 Bankruptcy
51XIV Reorganization
51XIV(B) The Plan
51k3566 Confirmation; Objections
51k3566.1 k. In General. Most Cited Cases

In bankruptcy case, party who is not directly aggrieved by construction of a provision of reorganization plan lacks requisite standing to object.

116 Judgment 228 C=713(2)

228 Judgment
228XIV Conclusiveness of Adjudication
228XIV(C) Matters Concluded
228k713 Scope and Extent of Estoppel In General

228k713(2) k. Matters Which Might Have Been Litigated. Most Cited Cases
 For purposes of claim preclusion, claim "could have been raised" in prior proceeding only where transaction or connected series of transactions at issue in both suits is same, that is, where same evidence is needed to support both claims, and where facts essential to second transaction were present in first.

117 Patents 291 C=199

291 Patents
291X Title, Conveyances, and Contracts
291X(B) Assignments and Other Transfers
291k196 Requisites and Validity of Assignments and Grants

291k199 k. Recording. Most Cited Cases
 Creditor's recording of patent assigned to it in debtor's bankruptcy proceeding did not preclude alleged infringer's claim that debtor, and hence creditor, did not have valid title; recording statute governed rights of competing assignees, not validity of rights purportedly transferred by assignment. 35 U.S.C.A. § 261.

118 Patents 291 C=199

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291 Patents

291X Title, Conveyances, and Contracts

291X(B) Assignments and Other Transfers

291k196 Requisites and Validity of Assignments and Grants

291k199 k. Recording. Most Cited Cases
 Patent recording statute does not grant patent assignee any title better than assignor had. 35 U.S.C.A. § 261; 37 C.F.R. § 1.54.

[19] Patents 291 C=94

291 Patents

291III Persons Entitled to Patents

291k94 k. Public Officers and Employees.

Most Cited Cases

When statute operates to vest patent title in government, subsequent transfers by inventor or anyone else, whether recorded or unrecorded, will not trump government's rights in invention.

[20] Patents 291 C=312(1.3)

291 Patents

291XII Infringement

291XII(C) Suits in Equity

291k312 Evidence

291k312(1) Presumptions and Burden of Proof

291k312(1.3) k. Ownership of Patent. Most Cited Cases
 Patent assignee alleging infringement bore burden, once its standing was challenged on motion for summary judgment, of coming forward with specific facts to support its claim of ownership, and this evidence had be sufficient for reasonable fact-finder to infer that assignee held title to patent.

[21] Federal Civil Procedure 170A C=1742(I)

170A Federal Civil Procedure

170AXI Dismissal

170AXI(B) Involuntary Dismissal

170AXI(B)2 Grounds in General

170Ak1742 Want of Jurisdiction

170Ak1742(1) k. In General. Most Cited Cases

Federal Civil Procedure 170A C=1831

170A Federal Civil Procedure

170AXI Dismissal

170AXI(B) Involuntary Dismissal

170AXI(B)5 Proceedings

170Ak1827 Determination

170Ak1831 k. Fact Issues. Most Cited Cases

On motion to dismiss challenging the court's jurisdiction, district court may engage in fact-finding and may dismiss factually sufficient complaint for lack of subject-matter jurisdiction if court finds, based on affidavits or other evidence outside complaint, that asserted basis for federal jurisdiction is not sufficient. Fed.Rules Civ.Proc.Rule 17(h)(1); 28 U.S.C.A.

[22] Patents 291 C=181

291 Patents

291X Title, Conveyances, and Contracts

291X(A) Rights of Patentees in General

291k181 k. Nature of Ownership of Patents.

Most Cited Cases

Patentee has presumptive title to invention.

[23] Patents 291 C=94

291 Patents

291III Persons Entitled to Patents

291k94 k. Public Officers and Employees.

Most Cited Cases

Patents 291 C=286

291 Patents

291XII Infringement

291XII(C) Suits in Equity

291k286 k. Persons Entitled to Sue. Most Cited Cases

Federal government retained title to invention conceived or reduced to practice as result of work carried out at university under federal funding agreement where inventor failed to sign encumbrance instruments required to retain title as against government, and thus inventor did not own subsequently obtained patent and his assignee lacked standing to sue for infringement. 35 U.S.C.A. § 202.

[24] Patents 291 C=116

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291 Patents

291IV Applications and Proceedings Thereon

291k110 k. Renewal of Application. Most Cited Cases

Cited Cases

Divisional and continuation patent applications may not contain any new subject matter.

1251 Patents 291 C=283

291 Patents

291X Title, Conveyances, and Contracts

291X(B) Assignments and Other Transfers

291k263 k. Rights and Liabilities of Assignees and Grantees. Most Cited Cases

Assignment of original patent application automatically carries with it ownership of all divisional, continuation, or reissue applications.

1261 Patents 291 C=97

291 Patents

291IV Applications and Proceedings Thereon

291k92 k. Patent Office and Proceedings Therein in General. Most Cited Cases

Cited Cases

Patent applicant's failure to rebuttal prior art which had been disclosed in parent applications was not inequitable conduct rendering patent invalid.

1271 Patents 291 C=126.6

291 Patents

291XII Infringement

291XIII(A) What Constitutes Infringement

291k226.5 Substantial Identity of Subject Matter

291k226.6 k. Comparison with Claims of Patent. Most Cited Cases

Patents 291 C=237

291 Patents

291XII Infringement

291XIII(A) What Constitutes Infringement

291k233 Patents for Machines or Manufactures

291k237 k. Substitution of Equivalents. Most Cited Cases

To infringe patent claim, each claim limitation must be presented in accused product, literally or equival-

ently.

1281 Patents 291 C=235(2)

291 Patents

291XII Infringement

291XIII(A) What Constitutes Infringement

291k233 Patents for Machines or Manufactures

291k235 Identity of Principle or Mode of Operation

291k235(2) k. Particular Patents or Devices. Most Cited Cases

Patent for "wormhole" computer routing system for transmitting messages from input to output circuits within massively parallel processor, which established path between circuits for each message and maintained it until message arrived at output circuit, was not literally infringed by competitor's message routing structure, which allowed interleaving of messages.

1291 Patents 291 C=226.6

291 Patents

291XII Infringement

291XIII(A) What Constitutes Infringement

291k226.5 Substantial Identity of Subject Matter

291k226.6 k. Comparison with Claims of Patent. Most Cited Cases

Under doctrine of "part-time infringement," if patent claim reads on part of an accused device, device infringes.

1301 Patents 291 C=191(2)

291 Patents

291IV Applications and Proceedings Thereon

291k101 Claims

291k101(2) k. Construction in General. Most Cited Cases

Claim that switch performed function "for each message," in patent for computer message routing system, required that switch, having decoded address element of each and every message, had to designate its path to output circuit and maintain same until message arrived at output circuit.

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131 Patents 291 C—166(1,1)

291 Patents

291IX Construction and Operation of Letters Patent

291IX(B) Limitation of Claims

291k168 Proceedings in Patent Office in General

291k168(2) Rejection and Amendment of Claims

291k168(2,1) k. In General. Most

Cited Cases

Patentee cannot recapture subject matter that was surrendered during prosecution of patent, and post-hoc, litigation inspired argument cannot be used to reclaim subject matter that record in Patent Office clearly shows has been abandoned.

132 Patents 291 C—165(5)

291 Patents

291IX Construction and Operation of Letters Patent

291IX(B) Limitation of Claims

291k165 Operation and Effect of Claims in General

291k165(5) k. Construction of Particular Claims as Affected by Other Claims. Most Cited Cases

Dependent patent claim must be narrower than its associated independent claim, and must incorporate by reference all of limitations of independent claim from which it refers. 35 U.S.C.A. § 112.

133 Patents 291 C—165(5)

291 Patents

291IX Construction and Operation of Letters Patent

291IX(B) Limitation of Claims

291k165 Operation and Effect of Claims in General

291k165(5) k. Construction of Particular Claims as Affected by Other Claims. Most Cited Cases

Narrower, dependent patent claim may cover device capable of more types of operation than device that would be covered by broader, independent claim.

134 Patents 291 C—237

291 Patents

291XII Infringement

291XII(A) What Constitutes Infringement

291k233 Patents for Machines or Manufactures

291k237 k. Substitution of Equivalents.

Most Cited Cases

Patent infringement by equivalents occurs when every element of the accused device at issue performs substantially same function, in substantially same way, to achieve substantially same result, as limitation at issue in claim.

135 Patents 291 C—237

291 Patents

291XII Infringement

291XII(A) What Constitutes Infringement

291k233 Patents for Machines or Manufactures

291k237 k. Substitution of Equivalents.

Most Cited Cases

Doctrine of equivalents must be applied to individual elements of patent claims, not to invention as a whole.

136 Patents 291 C—237

291 Patents

291XII Infringement

291XII(A) What Constitutes Infringement

291k233 Patents for Machines or Manufactures

291k237 k. Substitution of Equivalents.

Most Cited Cases

Patent for "wormhole" computer routing system for transmitting messages from input to output circuits within massively parallel processor, which established path between circuits for each message and maintained it until message arrived at output circuit, was not equivalently infringed by competitor's message routing structure, which allowed interleaving of messages.

Patents 291 C—328(2)

291 Patents

291XIII Decisions on the Validity, Construction,

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and Infringement of Particular Patents

291k328 Patents Enumerated

291k328(2) k. Original Utility. Most Cited

Cases

4,247,892. Cited As Prior Art.

Patents 291 C-328(2)

291 Patents

291XIII Decisions on the Validity, Construction,
and Infringement of Particular Patents

291k328 Patents Enumerated

291k328(2) k. Original Utility. Most Cited

Cases

1,212,773. Not Infringed.

Patents 291 C-328(2)

291 Patents

291XIII Decisions on the Validity, Construction,
and Infringement of Particular Patents

291k328 Patents Enumerated

291k328(2) k. Original Utility. Most Cited

Cases

5,546,391. Cited.

*352 Stephen B. Judlowe and Dennis J. Modolino,
Hopgood Calimafde Judlowe & Modolino, LLP,
New York, NY, for Plaintiffs.Christopher A. Hughes and Christopher K. Hu, Mor-
gan & Finnegan, LLP, New York, NY, for Defend-
ant.

DECISION AND ORDER GRANTING DEFEND-
ANT'S MOTION TO DISMISS PLAINTIFF'S
CLAIMS UNDER U.S. PATENT NO. 5,212,773
("THE 773 PATENT") FOR LACK OF STAND-
ING, OR IN THE ALTERNATIVE, GRANTING
DEFENDANT'S MOTION FOR SUMMARY
JUDGMENT FOR NON-INFRINGEMENT

McMAHON, District Judge.

Before me are several motions relating to the viability of plaintiff's claims for infringement of U.S. Patent No. 5,212,773 ("the 773 patent"), relating to a store-and-forward system for transmitting messages from input to output circuits within a massively parallel processor. For the reasons stated below, I conclude that (1) IBM's motion for summary judgment dismissing the case on the ground that plaintiff does

not have title to the patent, and thus cannot maintain this proceeding, should be *353 granted; and (2) assuming there is standing, IBM is entitled to summary judgment dismissing TM's infringement claims. While the 773 patent is enforceable, IBM's products do not infringe the patent's claims as interpreted by this Court.

Prior Proceedings

1. On November 8, 1999, this Court entered an order following a so-called *Markman* hearing, see *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996), 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577, in which I construed the claims in suit under the 773 patent. A supplemental *Markman* opinion was issued on December 17, 1999. Familiarity with that decision is assumed. See *TM Patents, L.P. v. International Bus. Machs.*, 77 F.Supp.2d 370 (S.D.N.Y. 1999).

2. On July 28, 2000, this Court entered an order disposing of a number of pending motions with regard to both the 773 patent and the other patent in suit. However, the Court ordered a hearing in connection with TM's motion for a declaration that the 773 patent was in fact enforceable and the parties' cross-motions for summary judgment on the issue of infringement of the 773 patent. That hearing was held on September 21, 2000.

3. On September 12, 2000, IBM filed with the Court a suggestion that TM had never obtained valid title to the 773 patent. I indicated that IBM's submission should be treated as a motion to dismiss for lack of subject matter jurisdiction and directed TM to respond. It filed papers in opposition on September 20. IBM filed a supplemental brief on October 6, addressing issues that were the subject of questions at the September 21 hearing. TM, at the Court's invitation, filed a reply to that brief on October 6. Thereafter, the parties filed written responses to questions propounded by the Court. ^{EN1}

EN1. The Court has considered: (1) TM and IBM's October 6 submissions responding to the Court's October 4 inquiry, (2) the parties' October 12 submissions responding to the

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Court's October 11 inquiry, and (3) IBM's October 17 and TM's October 18 submissions in response to the Court's final October 13 inquiry. I have also considered and relied on letters submitted by both sides on November 13, 2000. The Clerk is directed to docket all these letters to insure that they are part of the record.

I

IBM'S CHALLENGE TO THE COURT'S SUBJECT MATTER JURISDICTION

Statement of Facts

IBM contends that this Court lacks subject matter jurisdiction because TM procured the '773 patent through assignment from someone who never held valid title to the patent. While the parties have not presented me with extensive affidavit testimony or with live witnesses, they have assembled a plethora of ancient memoranda in order to reconstruct the history of this patent's ownership. The pertinent facts (which for the most part are undisputed, though the conclusions that follow from them are not) are as follows:

The invention under the '773 patent, entitled Wormhole Communications Arrangement for Massively Parallel Processor, was the brainchild of W. Daniel Hillis. At the time of the invention, Hillis was a graduate student at Massachusetts Institute of Technology. His attendance at M.I.T. was funded by the Hertz Foundation, a private foundation. He was not the direct recipient of federal government funding.

On April 28, 1983, Thomas Engelbinner of M.I.T. wrote to the Office of Patent Counsel at the Naval Underwater Systems Center in Newport, Rhode Island, and enclosed two patent applications-Hillis' application for what eventually became the '773 patent (entitled "Parallel Processor"), and an application for a second invention entitled "Processor/Memory Circuit." In his letter, Engelbinner disclosed to the Navy that M.I.T. was electing to treat the two patents as having arisen "354 under Advanced Research Projects Agency ("ARPA") Contract N-

00014-80-C-0505, and was further electing not to apply for the patents itself "because of budgetary constraints and the limited commercial potential perceived in the short term." (IBM 9/12/00 Submission at Ex. 2.) IBM has not supplied the Court with a copy of this contract, and given its extensive efforts (via document requests and Freedom of Information Act inquiries) to locate one from any and every possible source, I am constrained to conclude that no copy exists. However, IBM has located a March 1982 document that appears to be a modification or extension of this contract. (IBM's Oct. 17 Submission at Ex. 4.)

The wording of Engelbinner's letter is curious, in that M.I.T. does not assert that work on either invention was totally funded by the Department of the Navy. Indeed, what MIT said was almost deliberately opaque:

The inventors herein are primarily a group of graduate students at M.I.T. but from time to time a number of these inventors have been employed by M.I.T. as research associates funded by ARPA.

(Id.) Engelbinner did not identify how many inventors were involved in creating the two inventions and also did not state which (or how many) of those inventors fell within the ambit of "a number of inventors" who had been "employed by M.I.T. as research associates funded by ARPA." In particular, M.I.T. did not specifically identify Hillis as one of those Government-funded graduate students, or the invention for which Hillis alone was responsible as having been ARPA-funded.

Nonetheless, M.I.T. included Hillis' invention in the ambit of its ARPA disclosure. (Id.) And even though his fellowship was privately funded, Hillis, in contemporaneously published articles, admitted that he was working on an invention at MIT's Artificial Intelligence Laboratory, funded in part by Contract N-00014-80-C-0505 (IBM 10/6/00 Submission at Ex. 9, 10.)-the very contract under which Engelbinner claimed Government sponsorship for both inventions disclosed in his letter to the Navy. This "connection machine," as he called it, was the invention eventually embodied in the '773 patent can be seen by reading a 1982 article in the *International Journal of Theoretical Physics*, where Hillis described the proposed

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architecture of the connection machine as "a locally connected array of processing-memory cells." (IBM 10/6/00 Submission at Ex. 10.)

In addition, documents provided to IBM by M.I.T. include a copy of Hillis' original patent application (Ser. No. 499, 474), filed on May 31, 1983. It contains a handwritten notation "3803" in the corner; "3803" is the case number assigned to Hillis' invention by M.I.T. (*Id.* at Ex. 6.)

On the same day that Engellenger wrote to the Navy, he also wrote a memorandum to Hillis, summarizing discussions they had held during the preceding weeks (IBM 9/12/00 Submission at Ex. 3.) It appears from the memorandum that Hillis and his patent attorney had approached the M.I.T. Patent, Copyright & Licensing Office on a relatively urgent basis in order to clarify his own ownership rights and perhaps to induce M.I.T. to accept reassignment of the invention so that he could enter into an arrangement with IBM to manufacture prototype chips employing the invention. The first of these discussions apparently took place on March 23, 1983, according to a memorandum that Engellenger wrote to Arthur A. Smith, Jr., the head of M.I.T.'s patent office, on that very day. (TM 9/20/00 Submission at Ex. C.)

Engellenger's memorandum to Smith, if taken at face value, discloses that even Hillis conceded that some portion of his work could be considered Government-funded:

I explained to Hillis M.I.T.'s basic policy on inventions, that being, that if an invention is conceived or reduced to practice at M.I.T. with the use of sponsored research funds or significant amounts of M.I.T. funding or facilities, agreements "355 signed by all employees and visiting scientists require that the invention be assigned to M.I.T. *Hillis and his attorney felt that there were probably more than one invention here and that at least some aspect of the patent application being prepared by [the patent attorney] would belong to M.I.T. because of ARPA sponsorship.*" (*Id.*)

(*Id.* at p. 1.) (emphasis added). Of course, the highlighted language is hearsay within hearsay,^{FN2} and I have some difficulty concluding that it would be ad-

missible, even under the liberal standard of Fed.R.Evid. 802—both because Hillis himself later created documents suggesting that neither patent was created under Government sponsorship or belonged to M.I.T. (IBM 9/12/00 Submission at Ex. 5), and because the memo contains certain representations that appear to be inconsistent with the record. For example, Engellenger's memorandum states that Hillis claimed "a routing circuit" as belonging to him, while acknowledging that "a processing element (which was purportedly developed with ARPA sponsorship)" probably did not. (TM 9/20/00 Submission at Ex. C at 2.) However, M.I.T. Case No. 3802, which was assigned to a "Processor/Memory Circuit" (emphasis added), is listed in the relevant documentation as having been invented by Hillis and seven other graduate students (*Id.* at Ex. D.), while Hillis' singular invention was assigned M.I.T. case number 3803 and entitled "Parallel Processor." (*Id.*)^{FN3}

^{FN2} All of Engellenger's memoranda and correspondence are hearsay, though it would appear that some portions of those documents could be admitted into evidence under the business records exception to the hearsay rule if a proper foundation were laid. Fed.R.Evid. 803(6).

^{FN3} I am the first to acknowledge that this may not be an inconsistency, the language of patents being what it is.

Nonetheless, no one disputes that M.I.T. looked interest in owning and exploiting the inventions itself and was more than happy to waive its rights in the invention. However, in its letter to the Navy disclosing the patents (IBM 9/12/00 Submission at Ex. 2.), M.I.T. conceded nothing in terms of Hillis' sole ownership of any patents. Indeed, in his memorandum to Hillis, Engellenger identified Hillis (and another student) as having "from time to time been employed as research assistants funded by ARPA." (*Id.* at Ex. 3 at p. 1.) Thus, it seems that M.I.T. took the position that any and all patent rights associated with both inventions belonged to it in the first instance, whether Hillis thought so or not. And while the university volunteered to waive its rights in Hillis' invention, M.I.T. also specifically advised Hillis that he would need to

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file papers with the Department of the Navy in order to protect his title to the invention. (Id. at Ex. 2.)

MIT advised Hillis, at the time it offered to waive its rights in the invention that became the '773 patent, that it did so "subject only to the following conditions:"

First, your patent application should be amended to recite that "the government has rights in this invention pursuant to a contract with the Advanced Research Projects Agency No. N-00014-80-C-0505" and any licenses issued to commercial concerns under these inventions should acknowledge the government's royalty-free license to these inventions.... [other conditions omitted]

(Id. at Ex. 3 at pp. 1-2.) Engelkenner then stated, "If these terms are agreeable to you, I will be happy to present your case to the patent committee." (Id.) There is no evidence in the record to indicate whether Hillis did or did not consent to MIT's conditions, although, as will be seen below, the 1991 patent application that resulted in the issuance of the '773 patent did not contain any of the language demanded by the MIT as a condition of its waiver. (Id. at Ex. 11.)

*356 I surmise that the '773 patent application did not contain MIT's suggested language because Hillis took the position that at least one of the inventions he discussed with Engelkenner was his invention and his alone. Indeed, Hillis represented to the Department of the Navy, in a letter he wrote on November 14, 1984, that both inventions were his. Nonetheless, in that letter, Hillis very deferentially asks the Navy to authorize his rights in both inventions:

P.C. Lall, Esquire
 Office of Patent Counsel
 Naval Underwater Systems Center
 Department of the Navy
 Building 142
 Newport, Rhode Island 02840
 SUBJECT: Invention Disclosure under ARPA Contract

N-0014-80-C-0505

MIT Case 3802 "Processor/Memory Circuit"

MIT Case 3803 "Parallel Processor"

Dear Mr. Lall:

I am writing to request authorization to retain the patent rights on the inventions cited above.

Because these inventions were developed when I was a student at MIT supported by a fellowship from the

private Hertz Foundation and not through any government grants, it is my understanding that I retain the rights to patents that may be issued. I further understand that without addressing the question of ownership of the patent rights, MIT has elected not to seek patent protection for these inventions and suggested that retention of rights by the inventors is in the best interest of the public, as letters from MIT to your office indicate.

Through my affiliation with Thinking Machines Corporation, I am actively involved in continuing and expanding development of the inventions. We are integrating computer architecture and software innovations that promise important improvements in addressing urgent and very large scale Department of Defense problems. We are also exploring the application of my inventions to solving data processing concerns of other Federal agencies, and are both convinced of and dedicated to realizing the potential for comparable gains for non-Defense computational problems. Further, related to my deep appreciation of the value of the technology transfer to the civilian economy, we are aggressively designing applications software for responding to classes of problems of direct interest to society at large.

I close by repeating my request for your consideration in authorizing my retention of patent rights on the referenced inventions.

Your kind attention to this matter is very much appreciated.

W. Daniel Hillis

(Id. at Ex. 5.) (emphasis added)

It is not true, as TM now asserts (See TM 9/20/00 Submission at n.4.), that the Navy "dropped the matter" after receiving the above-quoted letter containing Hillis' rather veiled claim of right to the patents. What is true is that the Government was perfectly willing to authorize Hillis to retain ownership of the patents. Indeed, the Navy forwarded the necessary forms on at least two occasions: once to MIT, in November 1984, together with a request to provide the forms to those inventors who wanted to retain rights in the ARPA contract inventions (IBM 9/12/00 Submission at Ex. 4.), and once directly to Hillis in April 1986 (IBM 9/12/00 Submission at Ex. 7.). However, the Navy, having been notified by MIT,

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that it elected to treat the patents as having arisen under Government sponsorship, took the position that Hillis' rights in the invention were subject to the same conditions as M.I.T.'s rights. Those, of course, included a royalty-free license to the Government.

Hillis—by now employed by plaintiffs' predecessor-in-interest, the now-defunct Thinking Machines Corporation—was apparently³⁵⁷ no more interested in adjudicating this matter of ownership with the Navy than he had been with M.I.T. So he took the path of least resistance. He did not sign the forms the Navy required. Neither did he send a letter to the Navy advising them that he disputed the Government's assertion that he needed to sign anything at all.

I can only speculate about why Hillis, having asked the Navy for permission to keep his inventions, did not sign the forms that were sent to him by both M.I.T. and the Navy. The record is devoid of evidence on the subject; it contains no affidavit from Hillis, and his deposition testimony demonstrates a total lack of recall about the forms. There is no dispute, however, that he did not sign them. M.I.T. sent a set of confirmatory instruments (possibly those sent to M.I.T. by the Navy in November 1984) to Dr. Hillis at least as early as May 3, 1985. That they had not been signed and returned some 11 months later is evidenced by his receipt of a letter from M.I.T. dated April 3, 1986, warning Hillis that he was endangering his title by failing to return them:

We have recently been called by Ms. Ina Griffiths of the Office of Naval Research who told us that you have not yet returned the instruments to ONT. Ms. Griffiths asked us to contact you on this matter. *We strongly advise you to complete these instruments, since the lack of them can endanger your title to the inventions.*

(IBM 9/12/00 Submission at Ex. 6.) (emphasis added) In spite of this, Hillis did not return the forms, as reflected in M.I.T.'s June 24, 1987 "Report of Inventions and Subcontracts (Final)" for Contract No. N-00014-80-C-0505, which indicated that confirmatory instruments for Case No. 3803 had not been forwarded to the Navy as Contracting Officer. (IBM 10/6/00 Submission at Ex. 4.)

Ultimately, the '773 patent application, under the title "Wormhole Communications Arrangement for Massively Parallel Processor," was filed on Feb. 22, 1991. Hillis listed himself as the sole inventor. He did not disclose any governmental interest in the patent, including any compulsory license. The application for the '773 patent explicitly relates back to the May 31, 1983 application, Ser. No. 499,474 ("Parallel Processor") ("the great grandfather application"), which the parties agree is M.I.T. Case No. 3803, the original Hillis invention. As discussed below, the '773 patent is the result of successive applications that could not, as a matter of law, contain additional information or a different invention than that described in the original application. ~~End~~

END. See Part I.B.2, *infra*.

In view of the foregoing, IBM contends that Hillis lacked title to assign to Thinking Machines, because he failed to file the paperwork required by 35 U.S.C. § 201(d). Of course, if Hillis did not have valid title, then he could not convey good title to Thinking Machines, which in turn could not convey good title to plaintiffs—or so IBM argues. Since only a patent owner has standing to sue for infringement (except in a few discrete instances that are not relevant here), such a finding would be the end of the matter where the '773 patent is concerned.

Plaintiffs do not dispute that Hillis never sent in the forms that would have perfected his title as against the Government. They read the documents to suggest that Hillis never agreed with M.I.T. about Government sponsorship of the invention that became the '773 patent, and argue that Hillis needed no waiver by the Government because the invention was not Government-sponsored. Plaintiffs do admit, however, that there was never any formal adjudication of this controverted issue. As happens all too often in these situations, both Hillis and his assignor, Thinking Machines, were content to leave the situation murky. IBM, which has a lot riding on ³⁵⁸ being able to knock out TM's claims under '773 patent, is not.

Plaintiffs do not suggest that this Court embark on the time-consuming task of resolving whether '773's wormhole routing message network was invented

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with ARPA sponsorship back in the early 1980s—at least, not at this juncture. Rather, they make a number of purely legal arguments about why this Court has jurisdiction over the '773 infringement claims.

First, TM argues that it has sufficiently pled jurisdiction and standing, and that the resolution of any factual disputes must abide the trial of this action.

Second, plaintiffs contend that IBM is entopped to challenge TM Creditors' title, because it has reportedly admitted TM's title in documents previously filed in this action—indeed, as recently as last summer.

Third, plaintiffs assert that the Bankruptcy Court's award of title to the '773 patent to TM Creditors during Thinking Machines' bankruptcy proceeding—a proceeding to which both IBM and the Government were parties, and in which TM concedes the issue of defective title could and should have been raised—is *res judicata* on the question.

Fourth, TM claims that its title to the patent was secured by virtue of its recording of same following the bankruptcy proceeding, citing the patent recording statute, 35 U.S.C. § 261.

Fifth, if all else fails, TM asserts that IBM has the burden to offer sufficient competent evidence to warrant a finding that it lacks ownership of the patent, and that it has failed to do so. At a minimum, TM asserts that there is a disputed issue of fact on the question.

Discussion

A. The Issue of Standing is Jurisdictional and Must Be Determined by the Court at the Outset

{1}[2] Before a federal court can consider the merits of a legal claim, the person seeking to invoke the jurisdiction of the court must establish the requisite standing to sue. See *Phillips v. Arkansas*, 495 U.S. 149, 154, 110 S.Ct. 1717, 109 L.Ed.2d 135 (1990). "Whether a claimant has standing is the threshold question in every federal case, determining the power of the court to entertain the suit." *In re Quail*, 126 F.3d 380, 387-88 (7d Cir.1997), (quoting *Worth v. Seligman*, 422 U.S. 490, 498, 95 S.Ct. 2197, 45 L.Ed.2d

343 (1975)). It remains open to review at all stages of the litigation. See *National Org. for Women v. Scheidler*, 510 U.S. 249, 255, 114 S.Ct. 798, 802, 127 L.Ed.2d 99 (1994).

{3}[4] Standing requirements drawn from the Constitution look to whether the plaintiff has made out a 'case or controversy' between himself and the defendant within the meaning of Article III. See *Worth v. Seligman*, 422 U.S. 490, 498-499, 95 S.Ct. 2197, 2205, 45 L.Ed.2d 343 (1975). The plaintiff can do this by showing he has an "injury in fact," or a "distinct and palpable injury." *Association of Data Processing Serv. Orgs. v. Camen*, 397 U.S. 150, 90 S.Ct. 827, 25 L.Ed.2d 184 (1970); *Volley Forge Christian College v. Americans United for Separation of Church and State*, 454 U.S. 454, 102 S.Ct. 752, 70 L.Ed.2d 700 (1982). If TM is not the true owner of the patent, it suffers no injury in fact as a result of any alleged infringement. To bring suit for patent infringement, a plaintiff must have legal title to or be the exclusive licensee of the patent in suit. See *East APD & Son, Inc. v. Gumpco A.G.*, 134 F.3d 1090, 1093 (Fed.Cir.1998); *Abbott Lab. v. Dimedix Corp.*, 47 F.3d 1128, 1130 (Fed.Cir.1995); *Armstrong, Inc. v. Merit Index, Inc.*, 939 F.2d 1574, 1578-79 (Fed.Cir.1991). Thus, patent ownership is a prerequisite for application of the infringement statute, and also confers standing.

There is some confusion as to whether the question of patent ownership should properly be characterized as a challenge to TM's standing to bring suit, or to the *359 court's subject matter jurisdiction. Two other courts in this district have dismissed infringement claims when the plaintiff did not own title to the patent, on the basis that plaintiff "lacked standing to invoke the subject matter jurisdiction of the court." *RAD Data Communications, Inc. v. Paxon Elec. Co.*, 882 F.Supp. 351, 352 (S.D.N.Y.1995); *Intertec, Ltd. v. Apple Computer, Inc.*, 81 F.Supp.2d 471 (S.D.N.Y.2000); see also *GALA Techs., Inc. v. Reconvision Techs., Inc.*, 93 F.3d 774, 780 (Fed.Cir.1996) (calling the standing question "jurisdictional" and dismissing plaintiff's infringement claims on standing grounds). These holdings may have improperly conflated the issue of standing with subject matter jurisdiction. Cf. *DaSilva v. Kintha Int'l Corp.*, 229 F.3d

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138 F.2d Cir.2000 ^{FN5}; However, I need not delve into this theoretical problem at the present time. It does not matter whether this Court should properly treat the defendant's challenge to ownership as a motion for lack of subject matter jurisdiction under Fed.R.Civ.P. 12(b)(1), or for failure to state a claim due to lack of standing under 12(b)(6), or even as a motion for summary judgment on the merits of the question of ownership. As will be seen below, TM has failed to make the necessary showing of ownership under any theory.

^{FN5} In *DaSilva*, the Second Circuit considered whether the district court's dismissal of an employee's Title VII complaint based on the employer's not having 15 employees was for failure to state a claim or for lack of subject matter jurisdiction. The Second Circuit agreed with the district court, Judge Bernson, that Title VII's "15-employee" rule was a component of the cause of action, not a prerequisite to the exercise of subject matter jurisdiction. See *id.* at 360-61. *DaSilva* would offer more guidance here if the question of plaintiff's standing to bring suit were also at issue in that case.

B. Judicial Estoppel Does Not Bar IBM From Raising the Issue of Standing

[5] IBM has consistently admitted during the course of this litigation that TM Creditors LLC has title to the 773 patent. (See Def's Answer to the First Am. Compl., filed March 6, 1998, ¶ 15; Def's Am. Answer to the First Am. Compl., filed August 28, 2000, ¶ 15.) IBM also moved to add TM Creditors, which was not originally a party to this action, as a party plaintiff, asserting in connection with its motion that title to the 773 patent belonged to TM Creditors. (See Def's Mem. in Supp. of Def's Mot. To Dismiss, filed May 1, 1997, at p. 2 [2].) While it is arguable that the first answer, and even the joinder of TM Creditors, predates IBM's awareness of the Hillis issue, it is quite clear that IBM's amended answer, filed August 28, 2000, came long after defendant became aware of a possible cloud on TM's title. Indeed, IBM first raised the jurisdictional issue with counsel for TM by letter dated April 4, 2000. (IBM 9/12/00 Submission at Ex.

10.) Nonetheless, it admitted TM Creditors' ownership of the 773 patent almost five months later and a mere two weeks before it filed the suggestion of lack of jurisdiction with the Court. As far as TM is concerned, that should end the matter.

[6] TM argues that these admissions should prevent IBM from challenging TM's ownership of the patent under the theory of judicial estoppel. An admission made during the course of the litigation, however, is not the same as judicial estoppel, which "prevents a party from asserting a factual position in a legal proceeding that is contrary to a position previously taken by [the party] in a prior legal proceeding." *Borer v. Long Island R. Co.*, 997 F.2d 1028, 1037 (2d Cir.1993); see also 18 Charles A. Wright, Arthur R. Miller & Edward H. Cooper, Fed. Pract. & Proc. § 4477 (1991). The theory may be invoked where, (1) the party against whom the estoppel is asserted took an inconsistent position in a prior proceeding, and (2) that position was adopted by the first tribunal in some manner. See *Borer* at 1038. The doctrine clearly does not apply in this case. *360 IBM asserted TM Creditors' ownership of the patent in *this* proceeding for the purposes of joinder.

The purposes of judicial estoppel-to "preserve the sanctity of the oath" and to "protect judicial integrity by avoiding the risk of inconsistent results in two proceedings"-are not at issue here. See *Simon v. Safelite Glass Corp.*, 128 F.3d 68, 71 (2d Cir.1997) (internal quotation marks omitted) (emphasis added). IBM has not benefited from some prior judicial determination that TM owns the 773 patent, only to claim the opposite is true here for other purposes. Furthermore, the Second Circuit has recognized that "judicial estoppel does not apply when the first statement resulted from 'a good faith mistake or an unintentional error.'" *Id.* at 71 (citations omitted).

[7] Alternatively, TM argues that IBM's admissions of TM's ownership are formal judicial admissions that are conclusive against IBM in this action. See *Western World Insurance Co. v. Stark Oil, Inc.*, 922 F.2d 118, 122 (2d Cir.1990). However, "[s]ince an objection to subject matter jurisdiction goes to the power of the court to hear and decide the case, parties may not create or destroy jurisdiction by agreement

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or by consent." 5A Wright & Miller, Fed. Prac. & Proc. § 1350 at 204 (2d ed.1990); see also Members for a Better Union v. Servano, 152 F.3d 58 (2d Cir.1998). Similarly, the parties cannot by stipulation confer standing on a non-patent owner in contravention of the Constitution and the statute. IBM is thus correct that it cannot create otherwise non-existent jurisdiction by admission. See Boushield v. Rodriguez, 863 F.2d 233, 234 (2d Cir.1988).

C. The Question of Ownership Is Not *Res Judicata*
By Virtue of the Bankruptcy Court's Judgment

[8] Of equal or greater interest to this Court is the impact of the disposition of the '773 patent by the Bankruptcy Court in the District of Massachusetts in connection with Thinking Machines' bankruptcy proceeding. TM argues that the claim of ownership is *res judicata*, or precluded, by virtue of the determination of the Bankruptcy Court in the Thinking Machines bankruptcy. In that proceeding, to which IBM was a party, TM Creditors paid more than \$27 million in creditor claims in exchange for title to Thinking Machines' patents. The '773 patent was one of those patents. The Bankruptcy Court entered an order confirming Thinking Machines' Reorganization Plan, and ¶ 12 of that order provided that all transfers of property to the Plan Entities (of which TM Creditors was one) as provided in the Plan "... shall be legal, valid and effective and shall constitute the transfer to and shall vest in the Plan Entities good title to such property free and clear of all liens, charges, Claims, encumbrances, Administrative Claims, interests and rights of offset, except as expressly provided in the Plan or this Confirmation Order..." *In re Thinking Machines Corp.*, No. 94-13405 (Bankr.D.Ma. Feb. 2, 1996) (excerpts attached as TM 9/20/00 Submission at Ex. K.)

[9][10][11][12] A final judgment of a United States Bankruptcy Court is, of course, *res judicata* as to all matters properly before it that are necessary to that final judgment and that were or could have been litigated in the proceeding. See St. Pierre v. Durr, 208 F.3d 394, 399 (2d Cir.2000); National Labor Relations Bd. v. United Techs. Corp., 706 F.2d 1254, 1259 (2d Cir.1983); In re Teletronics Servs., 762 F.2d 185, 190 (2d Cir.1985) (applying *res judicata* rules to

bankruptcy matter). Under this doctrine, also referred to as "claim preclusion," a subsequent action will be barred where a claim between the parties has been litigated and decided. In determining whether claim preclusion applies, a court may consider whether (1) the prior decision was a final judgment on the merits; (2) the litigants were the same parties; (3) the prior court was of competent jurisdiction; and (4) the causes of action were the same. See Corbett v. MacDonald-Moline Servs., Inc., 124 F.3d 82, 87-88 (2d Cir.1997); *In re Teletronics Servs., Inc.* at *361 190. In the bankruptcy context, the court also asks whether an independent judgment in a separate proceeding would "impair, destroy, challenge, or invalidate the enforceability or effectiveness" of the reorganization plan. Sure-Snap Corp. v. State St. Bank and Trust Co., 948 F.2d 869, 875-76 (2d Cir.1991), although this particular inquiry "may also be viewed as an aspect of the test for identity of the causes of action." *Corbett* at 88.

However, the catch for our purposes is that the *res judicata* effects of a judgment extend only to matters that were properly before the Bankruptcy Court or that could properly have been brought there. ^{FN6} See *In re Teletronics* at 190. Therein lies the rub.

^{FN6} The question of title to the '773 patent was not actually litigated or determined in the bankruptcy proceeding. Accordingly, collateral estoppel, or issue preclusion (as opposed to *res judicata*, or claim preclusion), does not apply to bar IBM from raising the issue here. See Interseamco Corp. v. Sound Pilots, Inc., 107 F.3d 86, 91 (2d Cir.1997).

[13][14] The general principles are not disputed. Under the Bankruptcy Code, a debtor's estate consists of, *inter alia*, "all legal or equitable interests of the debtor in property as of the commencement of the case." 11 U.S.C. § 541(a)(1). The filing of a bankruptcy case does not, and cannot, give a debtor or its creditors greater rights in property than the debtor had prior to bankruptcy. See *In re Arpaio*, 734 F.2d 119, 124 (2d Cir.1984) (nonetheless affirming debtor's entitlement to avoid creditor's lien and enjoy exemption under bankruptcy Code); Old Stone Bank v.

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Twon I Bldg. Ltd. Partnership, 946 F.2d 271, 276 (4th Cir.1991). As a result, the Bankruptcy Court's jurisdiction "does not extend to property that is not part of a debtor's estate," Burkeford Hosp. Inc. v. RWH Partnership, 168 F.3d 693, 699 (4th Cir.1999), and even a confirmed bankruptcy plan "cannot furnish anyone rights to what was not property of the debtor's estate," Terry Clifford Supply Co. v. American Sec. Bank, N.A., 195 B.R. 66, 73 (S.D.Tex.1996). Thus, the Bankruptcy Court could not have passed title to the '773 patent if Thinking Machines had no title to pass.

IBM contends that no attempt was actually made in the bankruptcy proceeding to transfer any rights in Thinking Machines' patents beyond those the debtor actually owned. IBM is correct. The First Amended Joint Plan of Reorganization transferred only "the Debtor's right title and interest in and to... patents and patent applications of the Debtor" (IBM 10/6/00 Submission at Ex. 24 at 38.), while the Collateral Patent Assignment assigned "all of Assignor's right, title and interest" in the patents to TM Creditors. (Id. at Ex. 25 at frame 843.) IBM observes, correctly, that nothing in the "free and clear" language quoted above from the Final Judgment of the Bankruptcy Court is inconsistent with that, or expands on the inherent limitation of the Plan and the Collateral Assignment, namely, that they convey and/or assign whatever interest the Debtor has, and nothing more.

Both parties acknowledged at the hearing that no one involved in the Bankruptcy proceeding believed that the court actually adjudicated whether Thinking Machines owned the '773 patent.^{FN7} And there is no question in my mind that the Bankruptcy Court had jurisdiction to resolve disputes over the debtor's ownership to any particular estate asset. See 11 U.S.C. §§ 363(f) and 1123; Celotex Corp. v. Edwards, 514 U.S. 309, 307-08, 115 S.Ct. 1493, 1498-99, 131 L.Ed.2d 403 (1995). Thus I have no doubt that a challenge to ownership of the '773 patent could have been raised in the bankruptcy context. The question is whether the failure to do so bars litigation of that issue before me.

FN7. In its Supplemental Brief on this issue, TM asserts that the Bankruptcy Court did

actually adjudicate the issue (TM 10/6/00 Submission at 13.), but it offers no evidence to support that assertion—an assertion that contradicts its prior statements to the Court.

*362 IBM asserts that it neither challenged nor questioned Thinking Machines' title to the patent because it could not have done so, for several reasons. First, the issue was not "identical" to any issue raised in the bankruptcy, given the special meaning of "identity" for former adjudication purposes. Second, nothing in the Plan alerted it to the possibility of a title defect. Third, IBM had no incentive to raise the issue in the absence of notice. Fourth, IBM lacked standing to raise the issue because TM deliberately declined to create a justiciable controversy over any specific patent during the bankruptcy, or to identify any specific patent that they would later contend was infringed by IBM.

IBM is in substantial part correct.

"Under the doctrine of *res judicata* or claim preclusion, 'a final judgment on the merits of an action precludes the parties or their privies from relitigating issues that were or could have been raised in that action.' " St. Pierre v. Dyer, 208 F.3d 394, 399 (2d Cir.2000) (quoting Federalized Debt Stores, Inc. v. Mohr, 452 U.S. 394, 398, 101 S.Ct. 2424, 69 L.Ed.2d 303 (1981)). IBM was a party to the Thinking Machines' bankruptcy. However, that did not automatically confer standing on it to challenge the debtor's title to the '773 patent. And "*res judicata* is inapplicable if formal jurisdictional or statutory barriers precluded the plaintiff from asserting its claims in the first action." Computer Assoc. Int'l, Inc. v. Attel, Inc., 126 F.3d 365, 370 (Fed.Cir.1997).

[15] In a bankruptcy case, "a party who is not directly 'aggrieved' by the construction of a provision of the Plan would lack the requisite standing to be heard." In re Johns-Manville Corp., 68 B.R. 618, 624 (Bankr.S.D.N.Y.1986) ("Thus, no party may successfully prevent the confirmation of a plan by raising the rights of third parties who do not object to confirmation."), *aff'd in part and rev'd. in part on other grounds*, 78 B.R. 407 (S.D.N.Y.1987), *aff'd sub. nom.*, Kane v. Johns-Manville Corp., 843 F.2d

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636 (2d Cir.1988). "Only parties adversely affected by provisions of a plan may raise an objection to confirmation based on such provisions." *In re Gaston & Snow*, Nos. 93 Civ. 8517, 93 Civ. 8628, 1996 WL 694421 at *7 (S.D.N.Y. Dec.4, 1996) (quoting *In re Johns-Manville Corp.*, 68 B.R. at 623-24).

IBM argues that the only entity that could arguably have been "aggrieved" by any attempt to usurp title to the '773 patent was the U.S. Government (the true owner of the patent). And in fact, IBM, wearing its hat as competitor of TM, did lack standing to challenge TM's title to the '773 patent. It had not been charged with infringement of the '773 prior to the bankruptcy, and it was not charged with infringement during the bankruptcy. It was not even threatened with infringement of the patent during the bankruptcy. Indeed, TM deliberately refrained from identifying IBM as a potential target of future infringement actions, in order to avoid IBM's commencement of a declaratory judgment action touching on the validity of the patent. (IBM 10/6/00 Submission at Ex. 30.) Plaintiffs have admitted in response to IBM's interrogatory that IBM was not on notice of alleged infringement of the '773 patent until November 1, 1996, at the earliest. (See *id.* at Ex. 34.)

Without even a hint that Thinking Machines planned to charge IBM with infringement of the '773 patent, IBM had no standing to bring a declaratory judgment action against the '773 patent. It could not have adjudicated the issue, even if it had been aware of the alleged defects in Thinking Machines' title while the bankruptcy was pending. Justiciability "... requires an explicit threat or other action by the patentee, which creates a reasonable apprehension on the part of the declaratory plaintiff that it will face an infringement suit..." *Phillips Plastics Corp. v. Kata Hatsuon Kabushiki Kaisha*, 52 F.3d 1051, 1052 (Fed.Cir.1995) (referring to issue declaratory judgment on patent ownership in light of mere license negotiations and no threat of suit).

*363 TM counters by noting that IBM internal documents reveal defendant's fear that it might be infringing the patent. (TM 10/6/00 Submission at ¶ n. 10; Pl.'s Mem. in Opp'n to Def's Mot. for Summ. J. on Non-Infringement at Ex. A.) However, under

Phillips Plastics, it is a threat of suit by the patentee, not simply the inchoate fear that the patentee might sue, that confers standing. It is simply indisputable that IBM, in its position as competitor/potential infringer, could not have litigated the question now before me in the bankruptcy proceeding. ^{END}

^{END}. While the Government could have raised the issues in the bankruptcy, IBM is not in privity with the Government. Therefore, the former adjudication bar—which applies only to parties and their privies, see *St. Pierre v. Dyer*, 208 F.3d 394, 399 (2d Cir.2000)—does not apply.

However, to the extent IBM suggests that it could not have raised the issue of ownership because it had no interest whatever in uncovering defects in Thinking Machines' title to its purported patent during the bankruptcy, I am constrained to disagree. While TM's deliberate failure to raise the spectre of allegation rendered IBM disinterested in its status as a Thinking Machines competitor, IBM stood before the Bankruptcy Court wearing another hat as well—that of trade creditor. (See IBM's 10/6/00 Submission at 22 n. 5.) As I understand matters, TM Creditors, the entity that ultimately took whatever patent title Thinking Machines was able to pass, was formed for benefit of the debtor's trade creditors—that is, they would have to look to the results of patent infringement litigations for recompense of the amounts owed. While IBM's trade claims were apparently infinitesimal in relation to what was at stake in connection with the enforcement of the parties' various patents, it had the same incentive as any other trade creditor to ensure that it was getting something of value in exchange for giving up its trade debt. The trade creditors were getting the patents, but a patent without good title is not worth the paper it is written on.

Nonetheless, IBM's failure to raise the issue of ownership in the bankruptcy proceeding is not fatal to its claim here, because IBM could not have known about the possibility of a defect in the title. As a general rule, newly discovered evidence does not preclude application of *res judicata*. See *Sand v. Bank of New York*, 929 F.2d 916, 920 (2d Cir.1991). However, *res judicata* does not apply when the existence of the

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ownership issue "could not have been discovered with due diligence." *L-Tec Electronics Corp. v. Computer Electronic Org., Inc.*, 198 F.3d 85, 88 (2d Cir.1999) (finding new claims based on different legal theories rather than facts).

IBM contends that Thinking Machines had a duty to disclose all relevant facts concerning its assets prior to confirmation of the Plan. See 11 U.S.C. § 1125 (Disclosure Statement must contain "adequate information"). It is undisputed that no notice was given of any defect in or question about title to the 773 patent, and the issue never arose in the proceedings. And there is no evidence before me from which I could conclude that IBM should have been on notice of the alleged defect in title. Indeed, in the context of *this* lawsuit, it took years of discovery from multiple parties, as well as FOIA requests addressed to the Government, before the issue crystallized. In contrast, the court in *Sure Snap* found that the debtor, who was bringing subsequent claims against its creditors, "had adequate information about lender liability claims, prior to commencement of the... bankruptcy proceedings." *Sure-Snap Corp. v. State St. Bank and Trust Co.*, 948 F.2d 869, 873 (2d Cir.1991).

I agree with IBM that, in the absence of notice from Thinking Machines of possible clouds on title, the Bankruptcy Court would never have allowed a wholesale investigation to discover whether there existed some defect in TM's title in the more "364 than 100 patents and applications Thinking Machines purported to own. See *In re Eagle-Picher Indus.*, 169 B.R. 130, 134 (Bankr.S.D. Ohio 1994) ("one seeking to conduct [discovery] has the burden of showing good cause for the examination which it seeks.")

So while IBM would have been finally dilatory had it set on knowledge of a potential defect in a patent's title, it cannot be foreclosed from litigating the patent's ownership now, precisely because it had no such knowledge, and no way of obtaining it.

Finally, *res judicata* is also inapplicable because the claim raised in this proceeding was not identical to the claims raised in the Bankruptcy Court.

[16] For purposes of claim preclusion, a claim "could

have been raised" in a prior proceeding "only where the transaction or connected series of transactions at issue in both suits is the same, that is, where the same evidence is needed to support both claims, and where the facts essential to the second [transaction] were present in the first." *Interconexión Corp. v. Sound Pictor, Inc.*, 107 F.3d 86, 91 (2d Cir.1997) (quoting *SEC v. First Jersey Sec.*, 101 F.3d 1450, 1463-64 (2d Cir.1996)); see also *Computer Assoc. Int'l, Inc. v. Aloni, Inc.*, 126 F.3d 365, 369 (2d Cir.1997). What constitutes a single transaction "is a factual question to be determined 'pragmatically' based on factors such as 'whether the facts are related in time, space, origin, or motivation, whether they form a convenient trial unit, and whether their treatment as a unit conforms to the parties' expectations.'" *NBN Broad. Inc. v. Sheridan Broad Networks, Inc.*, 103 F.3d 72, 78 (2d Cir.1997) (quoting *Restatement (Second) of Judgments*, § 24(1) (1982)).

The actual litigation in the bankruptcy case between TM and IBM involved IBM's assertion of patent infringement by the Debtor. It was in this context that the set-off issue arose-whether IBM would be free to enforce its infringement claims against the successors to Thinking Machines should those successors decide to sue IBM. IBM objected to the use of the "free and clear" language in the conveyance of the patents to TM Creditors, not because it was challenging the validity of the title that would pass to TM Creditors under the Plan, but because it feared that the use of this phrase would preclude it from asserting counter-claims. (TM 9/20/00 Submission at Ex. M.) IBM eventually dropped the objection. Nothing in that sequence of events suggests that I should find the "identity of issues" prong of a *res judicata* analysis to be satisfied. ^{END}

^{END} The instant situation differs from the situation in the cases relied on by TM. In *Sure-Snap Corp. v. State St. Bank and Trust Co.*, 948 F.2d at 872-73, the focus of the bankruptcy proceeding encompassed the entire lender-debtor relationship, and the bank's post-lending conduct was also at issue in the subsequent proceeding. The trustee's motion to expunge plaintiff creditor's claims in *In re American Preferred Pre-*

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scription, 2000 U.S. Dist. LEXIS 10150, *3-6 (E.D.N.Y. March 20, 2000), was barred by the previous bankruptcy plan, which subordinated the creditor's claims. *Stoll v. Gotlieb*, 305 U.S. 165, 59 S.Ct. 134, 81 L.Ed. 104 (1938), was an action to recover on a guaranty of a corporation's bonds. The Supreme Court held that prior orders of the bankruptcy court denying plaintiff's petition to set aside a decree providing for release of a guaranty were res judicata on the issue of guarantor liability. See *id.* at 170-71, 59 S.Ct. 134. In each of those cases, res judicata applied because the issues in the second proceeding were identical to those that were or could have been raised in the first. Finally, in *Computer Assoc. Int'l, Inc. v. Atmel*, 126 F.3d at 369, the court found res judicata inapplicable.

In sum, I conclude that res judicata does not bar IBM's challenge to TM's ownership of the patent.

D. Nothing in the Patent Recording Statute Creates Ownership in TM if Its Assignor Lacked Ownership

[17] Plaintiffs argue that, even if Dr. Hill's failed to obtain title to the '773 patent, TM Creditors managed to get title simply because they recorded the assignment³⁶⁵ to them from TM Patents of the '773 patent.

The patent recording statute, 35 U.S.C. § 261, applies the common law bona fide purchaser rule to patent transfers. When the legal *title holder* of a patent transfers his or her title to a third-party purchaser for value without notice of an outstanding equitable claim for title, that purchaser takes entire ownership of the patent, free of any prior equitable encumbrances. See *FilmTec Corp. v. Allied-Signal Inc.*, 939 F.2d 1568, 1573 (Fed.Cir.1991). In addition, § 261 adopts the principles of the real property recording acts, in that it "is intended to cut off prior legal interests, which the common law rule did not." *Id.* at 1573-74.

Under the statute:

An assignment, grant or conveyance shall be void as

against any subsequent purchaser or mortgagee for a valuable consideration, without notice, unless it is recorded in the Patent and Trademark Office within three months from its date or prior to the date of such subsequent purchase or mortgage.

35 U.S.C. § 261. By its very terms, § 261 is only a recording statute. It governs the rights of competing assignees. The statute does not address the *validity* of the rights purportedly transferred by an assignment.

[18] In fact, the companion regulation, 37 C.F.R. § 3.54, expressly provides that "The recording of a document ... is not a determination by the [Patent and Trademark] Office of the validity of the document or the effect that document has on the title to an application, a patent, or a registration." (emphasis added) More to the point, the Federal Circuit has held that "the mere fact that an assignment was recorded in the PTO does not, without more, prove that a valid assignment actually took place." *Gd/A Techn., Inc. v. Reconception Techn., Inc.*, 93 F.3d 774, 778 n.3 (Fed.Cir.), *amended on other grounds by*, 104 F.3d 1296 (Fed.Cir.1996) (reversing lower court's finding of standing). Clearly, § 261 does not grant an assignee any title better than the assignor had.

[19] When a statute operates to vest patent title in the Government, subsequent transfers by the inventor or anyone else, whether recorded or unrecorded, will not trump the Government's rights in the invention. See *FilmTec Corp. v. Allied-Signal Inc.*, 939 F.2d 1568 (Fed.Cir.1991) ("FilmTec"); *FilmTec Corp. v. Hydronautics*, 982 F.2d 1546 (Fed.Cir.1992) ("Hydronautics"). Both of the FilmTec infringement cases arose from the same set of facts, and their similarity to the present case merits close analysis. The inventor, Cadotte, conducted his research while at MRI, a non-profit research organization, under contract to the Government. The contract, issued under authority of two federal statutes, provided that MRI: agrees to grant and hereby does grant to the Government the full and entire domestic right, title and interest in any invention, discovery, improvement or development (whether or not patentable) made in the course of or under this contract or any subcontract (of any tier) thereunder.

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FilmTec at 1570.

Sometime between September 1977, when FilmTec was organized, and the February 1979 filing of the patent application, Cadotte made the invention that led to the patent. Cadotte left MRI in February 1978. He assigned the patent on his invention to his company, and Filmtec recorded the assignment.

Cadotte claims he made the invention the month after leaving. Defendant-appellant Allied claimed Cadotte formed his invention while he was still at MRI. The trial judge did not address the question of when the invention was made, because he reached his decision in favor of granting a preliminary injunction to FilmTec on the grounds that the contract quoted above conveyed no more than equitable title to the Government. See *id.* at 1570. The 366 Federal Circuit disagreed, and found the contract "expressly granted to the Government MRI's rights in any future invention." *Id.* at 1573. Thus, "[i]f a similar contract provision existed between Cadotte and MRI, as MRI's contract with the Government required, and if the invention was made before Cadotte left MRI's employ..., Cadotte would have no rights in the invention or any ensuing patent to assign to FilmTec." *Id.* If that was the case, Cadotte's purported assignment to Filmtec would be "a nullity." *Id.* at 1572. The court remanded for findings on both questions.

On remand, the district court found that the invention was made while Cadotte worked at FilmTec, and reinstated the preliminary injunction. See *FilmTec v. Allied-Signal, Inc.*, 988 F.2d 129, 1993 WL 2309 at *1 (Fed.Cir.1993) ("Allied") (unpublished decision) (adopting findings of fact in *Hydramatics*). While Allied's appeal was pending, the Federal Circuit resolved the issue of ownership in *Hydramatics*, a different infringement case brought on the same patent. The court concluded that the statutes governing the MRI contract clearly provided for title to any invention made or conceived under contract to vest with the Government, and that the invention conceived while Cadotte was at MRI was the same as that described in the patent. See *Hydramatics* at 1550-51. The Allied court concurred in the *Hydramatics* analysis and adopted the findings, invalidating FilmTec's title. See *Allied*, 1993 WL 2309 at *1.

The *FilmTec* cases control here. Hillis admittedly developed the inventions in the '773 patent while he was at M.I.T. If his work was under the Government funding agreement, and if he did not comply with the requirements necessary for him to retain title, title passed to the Government. Hillis did not have anything to transfer to TM Patents, and the subsequent "transfer" to TM Creditors could not be rendered valid by recording it.

The cases cited by plaintiff do not support the proposition that recording cures the defect in title. In *Chas. Indus., Inc. v. L.P.S., Int'l, Ltd.*, 643 F.2d 289 (5th Cir.1981), a holder of patent rights executed two transfers on the same day: a recorded assignment to a subsidiary of the title, and an unrecorded reservation of the majority of rights in the parent company. See *id.* at 291-92. The court found that the intended effect of the two transfers was to keep the benefits of the patent as though the parent had retained title, while still recording the assignment of title. The court held that the unrecorded reservation of rights was an attempted assignment, and was thus ineffective against the bankrupt subsidiary's creditor, who later acquired the patent rights in liquidation by assignment, and was a bona fide purchaser for value without notice of the attempted assignment. *Id.* at 289. This case only shows the general rule under § 261 that a recorded assignment is valid as against an unrecorded assignment. The Government did not need to record its assignment because took title by operation of law. ^{FN10}

^{FN10} There was no document of assignment to record. If there had been, the assignment, if unrecorded, would be void as against subsequent assignees for value without notice. The fact that the government's title was vested before the bankruptcy would not save it.

Plaintiffs also rely on *Heidelber Harris, Inc. v. Loebach*, 145 F.3d 1454, 1458 (Fed.Cir.1998). Plaintiff Loebach assigned his rights in his invention to his employer in 1980. In 1983 that company entered an agreement with defendant Heidelberg Harris in which defendant would receive an unrestricted license to the patent in 1990. See *id.* at 1456. In 1991 Loebach won back his right to the patent in a suit against his former

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employer. See *id.* at 1452. He then sued defendant for infringement. The Appeals court upheld Heidelberg Harris' bona fide purchaser defense, agreeing with the district court that its title to the unrestricted license vested in 1983. See *id.* at 1459. Here again, defendant purchased the patent rights "367 from an entity that, at least until 1991, had valid title. TM Patents did not

If TM's arguments were correct, any charlatan could fraudulently convey the patents of another to any assignee, who could subsequently gain good title by simply recording the fraudulent assignment. The patent recording statute is no bar to IBM's claim.

8. TM has not raised a genuine issue of fact to controvert IBM's showing that TM does not have title to the '723 patent.

As none of TM's arguments enables it to avoid the merits of the dispute, I turn to the facts. Both sides agree that the party seeking to invoke Federal jurisdiction bears the burden of establishing standing. See *Lujan v. Defenders of Wildlife*, 504 U.S. 555, 361, 112 S.Ct. 2130, 119 L.Ed.2d 351 (1992); *Jagbery v. New York State Dept. of Educ.*, 131 F.3d 326, 329 (2d Cir.1997); *Imatoc, Ltd. v. Apple Computer, Inc.*, 81 F.Supp.2d 471, 480 (S.D.N.Y.2000); *Ortho Pharm. Corp. v. Genentech Inst., Inc.*, 32 F.3d 1026, 1032-33 (Fed.Cir.1995). However, TM argues that because it has pleaded ownership, the circumstances of this case trigger an immediate shift of that burden to defendants. I disagree.

1. TM bears the burden of proving ownership of the patent

[30] The burden of establishing TM Creditor's valid title does not shift to IBM just because IBM raised the jurisdictional issue. *Cadex-Singl Med. Ctr. v. Watkins*, 11 F.3d 1573, 1583-84 (Fed.Cir.1993). TM cites *Lockheed Aircraft Corp. v. United States*, 213 Ct.Cl. 395, 553 F.2d 69, 88-89 (1977), for the proposition that defendants must prove Government ownership. They argue that "[t]he 'heavy' burden of proving the gravamen of a Government entitlement defense, viz., conception and first actual reduction to practice within the scope of a Government procurement contract, is on the party raising that defense."

(TM 10/18/00 Submission at 2.) But *Lockheed* does not apply to this stage of the case. There the Government raised the defenses of invalidity and license in response to the infringement charge, and had the burden of proving those defenses. However, before addressing the defenses, the court stated that Lockheed "has been and continues to be the sole owner of the patent in suit." *Lockheed*, at 72. Thus, the jurisdictional question of ownership was not at issue. See *FilmTec*, at 939 F.2d at 1572-73 (cautioning against confusing plaintiff's right to maintain infringement action with *in jus tertii*, or title in a third person, defense). Thus, to establish standing, TM must demonstrate that Hillis and TM Patents held title to the '723 patent.

TM must do more than merely plead title ownership at this stage of the case. Where a standing issue has gone beyond the pleadings to summary judgment or trial, "the plaintiff must do more than plead standing, he must prove it." *Glover River Ctr. v. U.S. Dept. of Interior*, 675 F.2d 251, 254 n. 3 (10th Cir.1982); see also *Lujan v. Defenders of Wildlife*, 504 U.S. 555, 112 S.Ct. 2130, 119 L.Ed.2d 351 (1992). In *Lujan* the Supreme Court stated:

Since they are not mere pleading requirements but rather an indispensable part of plaintiff's case, each element must be supported in the same way as any other matter on which plaintiff bears the burden of proof, i.e., with the same manner and degree of evidence required at the successive stages of the litigation.

504 U.S. at 361, 112 S.Ct. at 2135. Therefore, to survive IBM's motion for summary judgment, TM must come forward with specific facts to support its claim of ownership, and this evidence must be sufficient evidence for a reasonable fact-finder to infer that TM holds title to the patent.

2. TM has not met its burden of proving subject matter jurisdiction

[21] In a motion to dismiss challenging the court's jurisdiction, the district court "368 may engage in fact-finding and "may dismiss a facially sufficient complaint for lack of subject-matter jurisdiction if the court finds, based on affidavits or other evidence out-

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side the complaint, that the asserted basis for federal jurisdiction is not sufficient." RAD Data Communications, Inc. v. Patton Electric Co., 882 F.Supp. 351, 352 (S.D.N.Y.1995) (dismissing patent infringement actions on grounds that plaintiff did not have legal title to patent-in-suit at time of alleged infringement). Here, however, there is really no need for fact-finding; the material facts are undisputed. The parties differ only in the conclusion they draw.

The parties do not dispute that Hillis' invention as claimed in the patent was developed and reduced to practice while he was at M.I.T. Neither do they dispute that the invention in the '773 is M.I.T. Case No. 3803, "Parallel Processor," which lists Hillis as the inventor. Nor do they dispute that the original '464 patent application, which was filed in 1983, pertains to the invention-in-suit. Plaintiff argues, however, that Case No. 3803 was not created under a federally-funded MIT/ARPA contract, and that Hillis' research on this invention is thus exempt from statutory requirements that he sign executory instruments in order to retain title as against the Government. Not only do they offer absolutely no evidence to support this, but TBM has provided extensive evidence to the contrary.

[22][23] A patentee has presumptive title to an invention. See Boech Aircraft Corp. v. EDO Corp., 990 F.2d 1237, 1248 (Fed.Cir.1993); Arachnid, Inc. v. Merit, Inc., 939 F.2d 1574, 1578 n. 2 (Fed.Cir.1991) ("The entity to whom the grant of a patent is made by the PTO [or that entity's successor in title] holds the 'legal title' to the patent."). However, the United States has title to all "subject inventions" made in performing work under a funding agreement with a research organization such as M.I.T. By statute, "subject invention" is defined as "any invention conceived or reduced to practice in the performance of work under a funding agreement." 35 U.S.C. § 201(c) (emphasis added). ^{FN1}

This means that the United States had title to any and all inventions that were either conceived or reduced to practice as a result of any work carried out at MIT's Artificial Intelligence Laboratory under the MIT/ARPA contract.

^{FN1}. Under 35 U.S.C. § 201(d),

"invention" is defined as "any invention or discovery which is or may be patentable under this title ..."

Non-profits conducting research under these government funding agreements can, under 35 U.S.C. § 202, elect to obtain title to any inventions developed under or derived from those agreements. A contractor must notify the Government of inventions made under the contract within a "reasonable time," 35 U.S.C. § 202(c)(1). Failure to comply with the conditions of § 202 results in the Government's acquiring title. See Thermatrix Indus., Ltd. v. U.S., 34 Fed. Cl. 411, 414 (Fed.Cl.1995) ("NSF [a Government entity] acquires title to a patent, rather than merely a license, *inter alia*, in the event the grantee fails to disclose within a reasonable time that the patented invention resulted from the grant.").

Under 35 U.S.C. § 202(d), an individual inventor can retain title to the patent providing he or she satisfies certain explicit conditions:

If a contractor does not elect to retain title to a subject invention in cases subject to this section, the Federal agency may consider and after consultation with the contractor grant requests for retention of rights by the inventor subject to the provisions of this Act and regulations promulgated hereunder.

The pertinent "regulations" are the Federal Acquisitions Regulations (FAR), which include specific requirements that the contractor (or the inventor if the contractor does not elect to retain title) affirmatively "369 execute confirmatory instruments and place an appropriate statement in the patent. 48 C.F.R. § 52.227-11(f)(1), -11(f)(4). ^{FN2}

^{FN2}. TM claims (in one of many footnoted substantive arguments) that inventors are not subject to the reporting requirements of Section 202(c); that as non-parties to the contract they are separately treated under 202(d) and exonerated from having to provide confirmatory instruments called for by 48 C.F.R. § 52.227-11(f)(1). TM offers no support for this proposition. M.I.T.'s own policies required that Hillis assign to the university inventions conceived or reduced

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to practice at M.I.T. with the use of sponsored research funds or significant amounts of M.I.T. funds or facilities. There is no evidence from which I could conclude that M.I.T. funds and/or facilities were not used by an M.I.T. graduate student in the creation of his invention. Hillis certainly does not deny it; his 1982 article confirms it. Thus, whatever Hillis did at M.I.T. belonged to the school unless the school waived its rights in the invention, as was clear from Bagellator's April 1983 letter to Hillis. (IBM 9/12/00 Submission at Ex. 3.) And if the invention known as Case 3803 belonged to M.I.T. rather than HBSA, Hillis had no standing to complain if M.I.T. elected to treat the invention as ARPA-sponsored.

M.I.T. Case No. 3803, which corresponds exactly to the invention described in the '464/773 application, was part of the ARPA contract. The best evidence of this comes from Hillis himself. In his 1984 letter he requested the Navy's authorization to retain the patent rights on both the 3803 and 3802 inventions, which can only be seen as an acknowledgment of the Navy's rights. He also admitted in contemporaneously published articles that his work on the inventions was funded by ARPA. Furthermore, Hillis has never explicitly stated that his invention was not developed under the contract. Aside from the self-serving innuendo in his 1984 letter to the Navy, in which Hillis intimated that the inventions were not developed with Government funding, TM offers no evidence that this invention was developed outside of ARPA sponsorship.

Hillis was thus obligated to execute the necessary forms with the Navy in order to obtain title. The evidence in the record is conclusive that he did not.^{FN13} Hillis received the proper forms from the Navy on three separate occasions. M.I.T.'s final report in 1987 on Case No. 3803 in 1987 showed Hillis had never forwarded the confirmatory instruments. TM has not been able to produce them in spite of the obvious advantage in doing so. Hillis himself has no recollection of signing or submitting them. Indeed, Hillis has not even submitted an affidavit other than testimony clearly asserting that he, not the Navy, was entitled to

the patent in the first place. His veiled suggestion to that effect in the November 14, 1984, letter does not suffice to raise a disputed issue of material fact in this regard—especially in light of his admission in the aforementioned 1982 article in the *International Journal of Theoretical Physics*.

FN13. Hillis also failed to place the required notice in the patent of the Government's rights in the invention.

TM argues that the Navy's decision to sign off on the contract without the confirmatory documents means it was conceding title. TM cites no authority for this proposition, no doubt because it is completely counterintuitive. TM in effect argues that the Navy had an obligation to take some affirmative action if it wanted to obtain title as against Hillis. However, § 202 clearly requires the inventor working under a funding agreement to take some affirmative action if he wants to obtain title as against the Government. The Navy made its position clear in view of M.I.T.'s disclosure, it owned the inventions; it was willing to cede those inventions to Hillis, in accordance with the provisions of § 202(d), but Hillis had to sign the forms for that to happen. He did not do so. As a result, he never took title to the invention.

Finally, there is no question that, if the Government owned the patent described under the parent application, it owned all *370 divisional and continuation applications derived from the '474 application.

First, as set forth above, divisional applications by definition are based on the same written description as the original application and do not contain subsequently developed inventions, as a matter of law. The invention claimed in the '773 patent must, as a matter of law (35 U.S.C. § 120), have been fully described in the original '474 application in accordance with the first paragraph of 35 U.S.C. § 112, because it is the result of divisional and continuation applications. Section 112 (¶ 1) requires that a patent application "shall contain a written description of the invention ..." (emphasis added). "An applicant complies with the written description requirement by describing the invention with all its claimed limitations...." *Gemco Gallery, Inc. v. Berlitz Corp.*, 134 F.3d

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1473, 1479 (Fed.Cir.1998) (emphasis added)(quoting Lockwood v. American Airlines, Inc., 107 F.3d 1565, 1572 (1997)); see also Mendenhall v. Cedarapids, Inc., 5 F.3d 1557, 1566 (Fed.Cir.1993) ("A patentee cannot obtain the benefit of the filing date of an earlier application where the claims in issue could not have been made in the earlier application.")

[24] Divisional and continuation applications may not contain any new subject matter: 'Continuation' and 'divisional' applications... are both ... based on the same disclosure as an earlier application. They differ however, in what they claim. A continuation application claims the same invention claimed in an earlier application, although there may be some variation in the scope of the subject matter claimed. A 'divisional' application ... [is] carved out of an earlier application ... [it] claims only one or more, but not all, of the independent inventions of the earlier application.

Transco Prods. Inc. v. Performance Contracting, Inc., 38 F.3d 531, 533 (Fed.Cir.1994) (emphasis added) (citations omitted).

Here, the text of the original '474 patent application, filed May 31, 1983 (IBM 10/1700 Submission at Ex. 5), is identical to that of the application which resulted in the '773 patent-*i.e.*, Application Serial No. 660,323 filed February 22, 1991. (*Id.* at Ex. 1.) The '773 patent on its face reveals it is derived directly from the '474 application through a series of divisional and continuation applications originating with the '474 application:

Division of Ser. No. 489,179, Mar. 3, 1990, Pat. No. 5,123,109, which is a division of Ser. No. 478,082, Feb. 9, 1990, Pat. No. 5,152,000, which is a division of Ser. No. 184,739, Jan. 27, 1988, Pat. No. 5,008,815, which is a continuation of Ser. No. 499,474, May 31, 1983, Pat. No. 4,814,973.

(IBM 10/1700 Submission at Ex. 14.) (emphasis added)

The written description of the '474 application (and thus the '773 patent) was complete as of the original filing date of May 31, 1983. Dr. Hillis' inventive activities with respect to the subject matter claimed in

the '773 patent necessarily ceased as of that date. See Mendenhall, 5 F.3d at 1566. If Dr. Hillis wished to claim new or later-developed subject matter, he would have been required either to file a completely new and separate application or to insert additional written description into the '474 application and to identify specifically the modified application as a continuation-in-part ("C-I-P"). See Traxson, 38 F.3d at 535 ("A 'CIP' application is a continuing application containing a portion or all of the disclosure of an earlier application together with added matter not present in that earlier application. See MPEP § 201.08") (emphasis added). There is, however, no such continuation-in-part application or separate application in the '773 patent lineage, nor was there any new disclosure added to the '474/'773 written description. Consistent with the identity of invention in the '474/'773 written description, plaintiffs admit that the invention claimed in the '773 patent was conceived*37f and reduced to practice "as of May 31, 1983." (IBM 10/1700 Submission at Ex. 2.) Clearly, nothing claimed in the '773 patent was invented by Dr. Hillis after the '474 application was filed on May 31, 1983. See Mendenhall, 5 F.3d at 1566. And at that time, he was a student at M.I.T.

[25] Furthermore, the Manual of Patent Examining Procedure ("MPEP") makes clear that the assignment of an original application automatically carries with it ownership of all divisional, continuation, or reissue applications. See MPEP § 201.12. This automatic ownership principle makes particular sense here since the written description of the original '474 application describes the subject matter of Fig. 6B-the very embodiment of the '773 patent claims-which was "actually reduced to practice" under the terms of, and during the term of, the NHT/ARPA contract (IBM 10/1700 Submission at Ex. 3 at ¶ 15-20.)

In view of the foregoing, TM has failed to adduce any evidence raising a disputed issue of material fact on the question of ownership/standing. There is simply no basis in this record to deny IBM's motion for dismissal/summary judgment on the ground that TM lacks standing to pursue the instant infringement claim.

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**ASSUMING THIS COURT HAS JURISDICTION,
 IBM IS ENTITLED TO SUMMARY JUDGMENT
 DECLARING THAT ITS PRODUCTS DO NOT IN-
 FRINGE THE '773 PATENT**

All parties and the Court have treated IBM's challenge to TMI's ownership as a challenge to the Court's subject matter jurisdiction. And, of course, a lack of subject matter jurisdiction would void all Court action with respect to the '773 (including the *Markman* decision interpreting the disputed claims). However, as noted in Section I.A. above, I have elected not to resolve the fascinating question of whether lack of standing goes to this Court's subject matter jurisdiction or is simply an element of its case-in-chief.^{FN14} Assuming *arguendo* that the issue of patent ownership does not go to the Court's power to act (i.e. subject matter jurisdiction), I reach the merits of the parties' cross motions for summary judgment of noninfringement as an alternative ground for decision. On the undisputed facts, I conclude that IBM is not infringing the '773 patent as I have interpreted its claims. Therefore, in the alternative, I grant IBM's motion for partial summary judgment of non-liability and deny TMI's cross-motion for a judgment of liability.

^{FN14} See discussion of the *DaSilva* opinion at n. 3, *supra*.

A. The Patent is Enforceable

[26] Before reaching the parties' cross-motions for summary judgment on the issue of infringement, I must dispose of a preliminary matter. Last summer, TMI moved for partial summary judgment declaring that the '773 patent was unenforceable. It anticipated that IBM would challenge the validity of the patent on the ground of fraud on the Patent Office. The relevant facts are undisputed and can be summarized quickly.

The '773 patent is a successor to applications that reach back as far as May 1983. In particular, it is a divisional application of Application Serial No. 489,179. In four related applications leading to the '773 application, including Serial No. 489,179, TMI had cited the patent examiner to the "Adams" patent.

Moreover, the Adams patent was relied upon by the examiner in disallowing each of those applications. However, the attorney who prepared the '773 application failed to disclose the Adams patent in the '773 application. IBM contended in its Answer to the First Amended Complaint and Counterclaims that this constituted inequitable conduct on '773's part, rendering the patent void and unenforceable.

The short answer to IBM's contention is that TMI was not required to disclose Adams in the '773 application, since that patent was disclosed in the four prior applications leading to the '773 patent. The Manual of Patent Examination Procedure (MPEP) states that an applicant need not resubmit references cited in a parent application because the examiner is required to consider information in a parent application when examining a continuing application (such as a divisional application). See MPEP § 609. The Federal Circuit recently ruled, "In view of MPEP § 609, it can not be inequitable conduct for an applicant not to resubmit, in the divisional application, the information that was cited or submitted in the parent application." *ATD Corp. v. Lundell, Inc.*, 139 F.3d 534, 537 (Fed.Cir.1998). This is true regardless of the materiality of the prior art reference to the patentability of the invention. See *Transmatic, Inc. v. Githon Indus. Int'l, Inc.*, 849 F.Supp. 526, 542 (E.D.Mich.1994).

IBM argues that *ATD* does not apply here—even though it resulted in summary judgment for the patentee against a charge of inequitable conduct due to non-disclosure—because § 609 did not become part of the MPEP until well into the prosecution of the '773 patent. It urges that the law in effect prior to November 1992, when § 609 became effective, was to the effect that an applicant was required to disclose all relevant prior art in a divisional application and could not rely on the patent examiner to locate that prior art in prior related applications. It further argues that TMI was on notice that the particular examiner who examined the '773 patent was unaware of Adams, so that regardless of the state of the law, it was inequitable not to apprise him of this particular prior art.

However, IBM's argument does not hold. There is no indication in *ATD*, or in the case it cited on the point—*Transmatic, Inc. v. Githon Indus. Int'l, Inc.*, 849

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E.Supp. 526, 539 (E.D.Mich. 1994) that the patent applications in suit postdated the final enactment of § 609. Indeed, the patent in *Transmatic* was issued on June 7, 1983, long before November 1992. And in any event, even under the MPBP prior to the addition of § 609, it was the patent examiner's responsibility to review patent applications for pertinent prior art. See MPBP § 705.05. A patentee cannot be penalized for a patent examiner's dereliction of duty. See *Hibbard of America, Inc. v. Magnavox Co.*, 707 F.Supp. 717 (S.D.N.Y. 1989).

The Federal Circuit has long decried the use of charging inequitable conduct in patent litigation. See *Presumption Devices, Inc. v. Minnesota Mining & Mfg. Co.*, 732 F.2d 903, 908 (Fed.Cir. 1984) (charges of inequitable conduct are a "much-abused and too often last-resort allegation"). As the PTO itself has determined that the conduct alleged by IBM is not inherently inequitable, this Court will certainly not second-guess it. TM's motion for summary judgment declaring the patent enforceable is granted.

B. IBM Is Not Infringing the '773 Patent

The '773 Patent Claims in Suit

While I have no wish to rewrite the *Markman* opinion, I must set forth a few pertinent facts about the '773 patent before I address the issue of infringement.

The '773 patent teaches a particular computer message routing system that uses a technique referred to by the parties as "wormhole routing." A wormhole routing system, which is described more fully in the *Markman* opinion, 72 F.Supp.2d at 392, is characterized by the ability to move the initial segments of a message from one node to the next appropriate node without waiting for the rest of the message to arrive at the first node—a sort of continuous stream routing of the bits of data that comprises a single message. Wormhole routing represents an improvement over "store and forward" routing, in which an entire message must arrive at a particular node before any portion of it can be transmitted to the next node, as well as over other forms of message routing.

As noted in the *Markman* opinion, TM originally took the position that the '773 patent patented the

concept of wormhole routing. I have already rejected that notion, ruling that the '773 teaches a computer system consisting of certain hardware (two or more processors and a message router), not a process of continuous message streaming, which is what wormhole routing is. Thus, I have already ruled that "TM has not patented wormhole routing, but rather a system for accomplishing that result." *Id.* at 393.

For our purposes, the most important language in the claims reads as follows:

(ii) a switch connected to said input circuits for, for each message received by said input circuits, decoding one address element of the message to identify therefor an output circuit, said switch establishing a path for said message between the input circuit which received the message and the identified output circuit to facilitate the transfer of message elements of said message there between, said switch maintaining the path until the last of the serially-received message elements for the message have been transferred to the identified output circuit.

In the *Markman* decision, I ruled that the phrase "said switch establishing the path" meant that the switch would decide where the message would go (to which node it would next be routed)—or, in other words, "...the switch sets up a path for the message to travel from the input circuit that received the message to the output circuit that was identified during the decoding process. When it does that, the switch 'establishes' the path [of the message]. It is fixed and will not be changed." *Id.* at 397, 116 S.Ct. 1384.

I further ruled that the phrase "said switch maintaining the path until the last of the serially-received message elements for the message have been transferred to the identified output circuit" meant the following: (1) the path between Node 1 and Node 2 that is set for Message A, once established, cannot be changed; (2) the path, once established, must be kept free for the exclusive use of Message A until that message has arrived at its destination node; and (3) no other message may cut across, or "interleave," the path that is being maintained for Message A during its transmission. *Id.* at 397-98, 116 S.Ct. 1384. For our purposes, the most important of those rulings is the notion that "interleaving" of messages is inconsistent

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with the concept of maintaining a path.

Under Independent Claims 1 and 9, the switch must establish and maintain a path for each message that goes through the system. This, too, was stipulated by the parties in connection with the *Marston* hearing. (IBM 10/6/00 Submission at Ex. 5.)

In the *Marston* decision, I held that these limitations, considered together, "are the heart of the computer system contemplated in the invention." *Id.* at 395, 116 S.Ct. 1384. After reviewing the materials submitted in connection with these motions, I reemphasize that holding. This is what the '773 patent is all about. If IBM's products do not do these things, then they do not literally infringe the patent, since if an accused product fails to satisfy even a single limitation of a claim, there is no literal infringement. See *Kahn v. General Motors Corp.*, 335 F.2d 1472, 1477 (Fed.Cir.1998); *Loitman Corp. v. Richmond Inc.*, 939 F.2d 1533, 1535 (Fed.Cir.1991).

IBM's Products vs. The Patent

Exhibit 1, appended to this opinion, is a visualization of the system contemplated by the '773 patent, copied from the patent file. Messages are received at the input circuits (depicted on the left side of the page) and pass over wires to the designated output nodes. Once a particular wire "belongs" to a particular message, it cannot be used for any other message until the message that first "claimed" the message has been fully transmitted from the input to the output circuit. This is what the patent claim means by "establishing and maintaining" a path (which was defined, per stipulation of the parties, as a wire and its associated logic).

In Claim 2, which is a dependent claim, the '773 adds a buffer that connects to the switch and stores messages destined for an output node that is already receiving a message. If there is competition between two messages for a particular destination, the first to arrive at the switch will proceed directly to that destination, while the other is stored in the buffer until the output circuit designated by the switch is once again free. Consistent with the notion of wormhole routing, the head of the buffered message will pro-

ceed to its ultimate destination as soon as that destination is free to receive it; it need not wait until the entire message has arrived at the buffer before it can move forward.

In the most general terms, the parties have identified two sets of IBM products that are alleged to infringe the patent: they identify them as "pre-Springwood" and "post-Springwood," with "Springwood" referring to a particular change that IBM made in message routing structure (described below). Exhibit 2 appended to this opinion is an exemplar of a pre-Springwood product; Exhibit 3 is a post-Springwood product. At the left of each of the illustrations is the input circuit; at the right, the destination, or output circuit. Between the two is something called the "central queue." TM describes this as the "buffer" described in independent Claim # 2 of the '773 patent—that is, a place where messages can be queued up or stored until they can be transmitted to their final destination—and it does indeed perform that function, at least in the so-called pre-Springwood products.

Under IBM's technology, messages are made up of constituent pieces called "flits" (for "flow control digits"). Flits are either 8 bits long (working with the so-called "Vulcan" switch) or 16 bits long (working with the so-called "Trailblazer" switch). A group of 8 flits is referred to as a "block." In pre-Springwood products, messages could be up to 255 flits long, while post-Springwood, message length is theoretically unlimited.

The difference between the pre-Springwood and post-Springwood products is the existence in the former of a working 8 by 8 "crossbar," or direct connection, that allows messages to travel between the input and the output circuits without going through the central queue. In the post-Springwood products, the crossbar has been disabled (by causing it to "think" that all output circuits are busy), so all flits move into the central queue and are routed from there to their destination node.^{FN15} This change was made in 1997. TM contends that the change was made to avoid liability for patent infringement.

FN15. To be precise, the pre-Springwood products are the Vulcan chip switch and the

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Trailblazer chip switch without the Springwood alteration. The post-Springwood products are Trailblazer chip switches with the Springwood alteration.

The absence of the crossbar, or direct path, between input and output circuits, is a major difference between the post-Springwood IBM products and the '773 claims. As will be seen below, this modification makes IBM's post-Springwood chips rather unlike the chips envisioned by the '773 patent. However, the pre-Springwood IBM products operate remarkably like the preferred embodiment of the '773 patent, reading under both Claims 1 and 2. They have a direct path between the input and output circuits (Claim 1). And they have a buffer where messages can wait when the direct path is unavailable (Claim 2).

Messages arrive at the input circuits on a flit by flit basis. In both the pre-Springwood and post-Springwood products, the "575 first flit of the first message to reach the input circuit (Message A) is assigned by the switch to a path to an identified output circuit (along the right side of the page), whereupon it is sent to that output circuit. Whenever there is message contention in the pre-Springwood products, and in the case of all messages in post-Springwood products, the flit is diverted to the central queue (the buffer), from which it will be sent on when its designated output circuit is free. ^{EN16}

EN16. The central queue is part of a switch structure that is itself the subject of an IBM patent, U.S. Patent No. 5,546,391 ("Hochschild").

Nonetheless, behind this superficial (and appealing) similarity lies a substantial difference in the way the two systems operate when there is contention for the same output node—a difference that also carries over into the post-Springwood era products.

IBM contends that none of its products infringe the '773 because operation of the central queue must be considered when one defines what is going on in the portion of the IBM product that provides the "switching function"—i.e. transferring each and every message received on an input port (i.e., receiver) to

its respective destination output port (i.e., transmitter). ^{EN17} (See IBM 10/12/00 Submission at 1). An inherent operational characteristic of the switch as defined by IBM is to interleave chunks of different messages with each other when multiple messages are in the process of transiting the central queue (either because they cannot transit the crossbar in pre-Springwood products, or because all messages go via the central queue in post-Springwood products). The logic ("receiver arbitration logic") that controls the movement of the flit between the input circuit and the central queue employs a methodology known as the Least Recently Used ("LRU") algorithm. Under that algorithm, the central queue "reaches" for the flit that is waiting in whatever input circuit was least recently connected to it. So, for example, if Message A is arriving at the queue from Input Circuit # 1, Message B is arriving from Input Circuit # 2, and Message C from Input Circuit # 3, the entirety of Message A (assuming that to be the first message that arrived on the scene) will not be transmitted through the queue before either of the later-arriving messages flows through. Rather, after taking a flit from Message A, the switch will check to see whether there is anything in another input circuit, and if there is, will process the flit that is waiting in whatever input circuit was least recently connected to it. ^{EN18} As flits emerge from the central queue, there is a parallel LRU logic that causes the output port that was least recently used to read its incoming flit ahead of a more recently used output circuit. To IBM, this inherent characteristic of the central queue means that its products, whether pre- or post-Springwood, cannot possibly infringe Claim 1, because different flits of different messages are continually being interleaved, both as they come into the central queue and as they emerge therefrom. ^{EN19}

EN17. I refer to this component of IBM's product as a "switch" for convenience. IBM maintains that there is no "switch" or "switch equivalent" to the '773 patent.

EN18. The easiest analogy I can think of for the LRU algorithm is the Big Ten Football Conference's long-standing method for selecting a Rose Bowl representative when two or more teams are tied for the confer-

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once championship: the team that has gone the longest without making a Rose Bowl appearance gets the nod. This rule was not modified by the conference's participation in the BCS ranking system. See "Method to Determine Rose Bowl Participant" (visited Nov. 4, 2000) <www.bigten.org/sports/football/releases/tiebreaker.asp>.

FN12. TM does not claim that its patent teaches anything like the LRU logic employed by IBM.

TM responds by arguing that pre-Springwood products infringe the '773 literally to the extent that messages that are free to do so transit the crossbar. TM referred to this at oral argument as "part-'376 time infringement" of the patent. Put otherwise, TM claims that the crossbar is the switch in the pre-Springwood products, and argues that the independent claim (Claim 1) is necessarily infringed whenever there is no competition for a particular output circuit, because to that extent IBM's products operate exactly like the '773 patent says they should. And to the extent that pre-and-post-Springwood products send messages through the central queue, TM argues that they infringe by equivalents, because IBM's use of a process known as dynamic multiplexing means that a *de facto* discrete path is established and maintained for each message within the central queue.

Infringement Analysis

[22] To determine infringement, the claims as construed are compared to the allegedly infringing device. See *Texas Instruments Inc. v. Cypress Semiconductor Corp.*, 90 F.3d 1558, 1563 (Fed.Cir.1996). To infringe a claim, each claim limitation must be present in the accused product, literally or equivalently. See *Solomon Domett Group, Inc. v. DePuy-Motech, Inc.*, 74 F.3d 1216, 1220 (Fed.Cir.1996). On motions for summary judgment, the Court is not sitting as a finder of fact, however. I am limited at this juncture to determining whether there exists any disputed issue of material fact, and whether, on the undisputed facts, judgment is warranted as a matter of law.

I consider first whether there is any evidence from which a reasonable jury could find that IBM's products infringe the '773 patent literally, and then whether they could be said to infringe under a doctrine of equivalents. I elect to consider IBM's motion first, and therefore view the evidence most favorably to TM for purposes of this motion.

Literal Infringement

[23] On the undisputed facts, IBM's products, whether pre-or-post Springwood, do not literally infringe the '773 patent.

The issue is easiest to understand with the post-Springwood chips, so I will address them first. Because the crossbar has been disabled in these chips, all portions of all messages proceed to a single central location, from whence they are transmitted to their respective output nodes. Not all bits of a single message run into or out of the central queue over the same path, and the transmission of one message to its output circuit can be (and frequently is) interrupted by the transmission of bits from other messages, based on the LRU algorithm. Thus, the switch employed in the post-Springwood products does not "establish" or "maintain" a path as I have construed those terms from the '773 patent.

This is easiest to comprehend if one focuses on the concept of "maintaining the path until the last of the serially received message elements for the message have been transferred to the identified output circuit." The term "maintaining a path" has already been defined to preclude interleaving-based in significant part on a statement made by TM's counsel at the *Markman* hearing, to the effect that "if you interrupt that path and you make the original message stop and let that path be used by somebody else, then you're not maintaining the path." (*Markman* H'g Tr. at 295.) But IBM's products employ a shared-connection approach, in which multiple messages traverse the same path elements within the switch between the input and output nodes. Particular segments are never maintained for the exclusive use of a particular message. Indeed, because the central queue has only one in-port and one out-port, all bits of all messages enter and exit the central queue along the

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same path, with segments of different messages interleaving constantly. More significant, in view of the *Markman* decision, is the fact that any particular set of wires and logic elements remains dedicated to a particular message only as long as it takes a particular chunk (eight bits) of a message to traverse that particular leg of the path. Once the chunk has passed, the path becomes³⁷⁷ free, and the next thing that crosses it is as likely to be a chunk from a different message as the next chunk of the original message. There is nothing in IBM's system, as I understand its workings, to prevent a chunk from Message B to break the continuity between two chunks of Message A along the same path (again, defined as a combination of wires and logic elements).

IBM also argues persuasively that its post-Springwood system does not "establish a path" for a message as I defined that term. To satisfy the "establishing" element of the claims, the arrangement of wires and logic elements that carry a given message must be set and fixed for all elements of a given message from the input circuit all the way to the designated output. The route the message takes from the former node to the latter cannot be altered during the message's transmission. In all IBM post-Springwood switches, however, every message passing through the central queue is broken up into discrete chunks, which are repeatedly interleaved with the chunks of any other messages that also happen to be passing in to or out of the central queue. To the extent that any set of wires and logic elements might be set, it is only for the particular path segment running from the input to the central queue, and subsequently the segment running from the queue to an output. No path is established at the outset from beginning to end. That is not what this Court meant when I interpreted the phrase "establishing the path."

I therefore conclude that no reasonable juror could find that the operation of IBM's central queue literally infringes the '773 patent claims as construed by my *Markman* decision.

[29] Matters are trickier when considering the pre-Springwood products, because there is no evidence contradicting TM's conclusion that IBM's and TM's switches operate identically to the extent that a par-

ticular message's designated output circuit is free. TM is of course correct that there is a doctrine known as part-time infringement, and that if a claim reads on a part of an accused device, the device infringes. See *Smitiger, Inc. v. Scientific Research Funding Group*, 189 F.3d 1322, 1336 (Fed.Cir.1999), citing *Bell Communications Research, Inc. v. Pitelink Communications Corp.*, 35 F.3d 613, 623 (Fed.Cir.1995) ("It should be noted any future infringement analysis respecting the assigning step should be undertaken with due attention to the principle that an accused product that sometimes, but not always, embodies a claimed method nonetheless infringes.")

IBM does not deny the existence of the part-time infringement doctrine (which was recognized in this Circuit nearly a century ago, see *Wright Co. v. Henning-Curtis Co.*, 211 F. 654, 655 (2d Cir.1914)). Nor does it deny that its pre-Springwood products infringe TM's patent if one focuses solely on the operation of the crossbar in non-contention situations. Instead, IBM argues that part-time infringement is precluded in the case of the '773 patent by the very terms of the claim limitation language.

IBM's argument derives from Claim 1's use of the phrase "for each message." As noted above, the claim language does require that the switch perform the decoding, establishing and maintaining functions for each message that arrives at an input circuit. IBM contends that this claim language requires that one look at how the product functions in connection with each and every message that passes through the system (i.e., in both contention and non-contention situations), so that if its products do not literally infringe all of the time (i.e., in connection with the routing of each message), they do not infringe at all. Since IBM argues that there is no evidence from which a reasonable juror could conclude that messages which are diverted to the central queue literally infringe Claim 1—a proposition with which I have already indicated agreement—IBM concludes that its product does not infringe³⁷⁸ Claim 1 of the '773 patent. In IBM's view, only a device that infringes with respect to each message can infringe the '773 patent.

These arguments point to a gaping hole in the Court's *Markman* decision. At the *Markman* hearing, the

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parties did not focus on the meaning of the word "each" in the phrase "for each message," and the Court did not discuss that term in its opinion (having no idea that it was disputed). Indeed, the parties appeared to agree that "all of the recited functions of the 'switch' claim must be performed on each and every message, without exception." (IBM 10/4/00 Letter at Ex. 5, citing, *inter alia*, PT's Reply Mem. at 39, n. 34.) However, it has become clear to me as I worked my way through the papers submitted on the instant motion that the parties do dispute, quite vigorously, what is meant by the term "each" in the phrase "for each message."

IBM contends that the word must be read literally; that is, that the switch, having decoded the address element of each and every message, must designate its path to the output circuit ("establish" the path) and maintain the same. Under such a reading, as far as I can discern, the only embodiment that would fall under the claim language is one in which a message where a direct path to the output circuit is in use would nonetheless have a path established by the switch, would then be buffered, and once released from the buffer would proceed to the path set for it by the switch before it was buffered.

TM argues that IBM's reading of the term "each" is overly restrictive. It contends that the invention claimed in Claim 1 will work only in the non-contention situation, when in fact each message can be routed directly to its designated output along a maintained path, and that one must proceed to Claim 2 in order to address the message contention situation. Indeed, TM notes that even the preferred embodiment shows a system in which the switch (1) established a path to the designated output when there is no contention for that output circuit, but (2) established a path to the buffer (the structure added in dependent Claim 2) in contention situations. TM's affidavits reveal that, when the designated output circuit is free, the message does not necessarily proceed out of the buffer and to the output along a path that was set by the switch prior to the message's arrival at the buffer. (See, e.g., Kurzmaul Aff. ¶ 5.)

[30] This newly-crystallized dispute adds a wrinkle to the situation. However, I must side with IBM on this

issue, because it is not possible to read the word "each" in a way that supports TM's claim of part-time infringement. Doing so would violate the first maxim of the *Amarman* decision.

The first principle undergirding the *Amarman* hearing was set forth as follows:

In construing the patent ... I have adopted the principle that, where the language of the claim is clear and unambiguous, I will read nothing additional into it.

TM Patents, L.P. v. IBM Corp., 72 F.Supp.2d at 380.

There is nothing unclear or ambiguous about the words "for each message." Each is not synonymous with "every." Thus, had I been aware at the *Amarman* phase that the parties disputed the meaning of the word "each," I would have given it a literal interpretation notwithstanding the fact that the preferred embodiment apparently does not establish and maintain a path to the output circuit for each message in a contention situation. The *Amarman* decision is deemed amended accordingly.

Reading "each" as "some" would also allow TM to recapture certain elements that it disclaimed in order to obtain allowance of the '773 patent. In claim element iii of Claim 1 of the '773 patent, TM originally used the following language:

(iii) a switch connected to said input circuits for decoding at least one address element of each message received by said input circuits to identify therefor an *379 output circuit, said switch establishing a path from at least some of said input circuits to the output circuits identified for the messages received thereby to facilitate the transfer of message elements there between...

As allowed, the relevant claim language reads as follows: (iii) a switch connected to said input circuits for, for each message received by said input circuits, decoding one address element of the message to identify therefor an output circuit, said switch establishing a path for said message between the input circuit which received the message and the identified output circuit to facilitate the transfer of message elements of said message there between... ^{FN20}

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FN20. I here highlight the language that is relevant to my analysis of the parties' arguments. I note that, at the *Markman* hearing, the parties focused on the meaning of the word "one," used elsewhere in this limitation. That issue is discussed extensively in the *Markman* opinion and is also the subject of a supplemental order, dated December 17, 1999 (which supplemental order ought to be appended to the published *Markman* decision—an omission the Court will rectify). That language is omitted from this discussion, because it has nothing to do with the dispute here identified.

TM added the words that limited claim (II) to "each message received by said input circuit" after the patent had been rejected by the Examiner on the basis of prior art—specifically, the Lawrence patent. This rejection is discussed in some detail in the *Markman* opinion. See *TM Patents, L.P. v. IBM Corp.*, No. 97-1529 at 3 (S.D.N.Y. filed Dec. 17, 1999) ("Supplemental *Markman* Ruling").

In making this and other changes to the claims in order to avoid rejection, TM made the following representation to the Examiner:

One benefit of the invention recited in claim 35 [now claim 1] is that a router node can, when it receives enough of a message to determine an output circuit over which it will transmit the message, will establish a path from the input circuit to the output circuit, which it will maintain until the entire message has been transmitted....

It should be noted that this explanation does not focus on the use of the phrase "for each message." But, fairly read, it supports the Court's prior finding that paths must be established all the way from input circuit to output circuit as soon as the router node receives enough of a message to decode its address. The claim does use the language "for each message," and there is no indication in either the claim or in the prosecution history that this benefit of the invention applies only to some of the messages that are passing through the system.

The Examiner, as noted in the *Markman* decision,

distinguished Lawrence when it finally issued the patent. However, he did not do so on the basis of the addition of the "for each message" language. He did so because Lawrence taught a "store and forward" system of message routing, rather than a wormhole routing system. See Supplemental *Markman* Ruling at 483-484. While he sets forth the very language from TM's "persuasive" response to his prior rejection that I have quoted above, he says nothing explicit about the need for this system to apply to "each" message. Thus, nothing in the language on which I relied in the *Markman* decision would support a finding that the "for each message" language was inserted to overcome Lawrence.

[31] However, Lawrence is not the only prior art of relevance. IBM points the Court to additional prior art that was neither focused on at the *Markman* hearing nor specifically mentioned by the Examiner. Specifically, it calls my attention to an article by Lerman and Kleinrock, "Virtual Cut-Through: A New Computer Communication Technique," (IBM 11/13/00 at Ex. 5), which TM cited to the Patent Office in a September 24, 1992 Information *380 Disclosure Statement. Having reviewed Lerman and Kleinrock, I conclude that it disclosed a system in which a path is established for at least some messages. (See *id.* at "Abstract" and p. 268). Just two months after receiving this prior art citation from TM, the Examiner stated, "The art of record fails to teach or remotely suggest the claims in their verbatim as they stand and/or as argued by the applicant in his response...." (emphasis added) "In their verbatim," the claims apply to each message, not just to some messages. In view of the fact that the art of record includes a system that establishes a path for some messages, I see no way around the conclusion that TM's invention is limited to a system that establishes a path "for each message," and that the insertion of that precise language was done to overcome the impact of prior art. It has long been settled that a patentee cannot recapture subject matter that was surrendered during prosecution of the patent, and that post-hoc, litigation inspired argument cannot be used to reclaim subject matter that the record in the PTO clearly shows has been abandoned. See *Quincy Products, Inc. v. Quaker Labs, Inc.*, 157 F.3d 1325, 1340 (Fed.Cir.1998).

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In its briefs and at the hearing, TM revealed that the switch in the preferred embodiment does not establish a path between the input and output circuits when there is message contention, but only establishes a path from the input circuit to the buffer. But this does not resurrect its abandoned claim; it merely indicates that the preferred embodiment set forth in the patent file teaches both Claims 1 and 2, and does not show a system that embodies only Claim 1. To the extent that the Court made any statement in its *Markman* opinion which suggested it was adopting the logical fallacy TM propounds here, ^{FN21} I can only apologize and correct my error here.

^{FN21} TM points to the following *Markman* opinion sentence, "If that identified circuit is busy, then the head of the message must proceed to a message buffer, which will be discussed later," to support its claim that the Court, either explicitly or *sub silentio*, recognized that the word "each" meant "some." If my language left this impression, I apologize. As noted above, this aspect of the claim language was not the subject of argument by the parties and was not thought about, let alone addressed, by this Court. Frankly, I was too busy trying to make sense of what the parties were arguing to hypothesize about what they might have argued.

[22][33] Therefore, I must reject TM's "part-time infringement" argument. IBM is correct that no reasonable trier of fact, in view of the claimed requirement that the switch establish and maintain a path all the way to the output circuit for each message, rather than for some messages, could define the "switch" as the crossbar, or could look to the operation of IBM's message routing products in non-contention situations alone. The logic used in the pre-Springwood chips when there is message contention and the central queue is used is identical to that used in the post-Springwood chips—that is, messages are transmitted in chunks; paths consisting of wires and logic are established and maintained only as long as a particular chunk is in transit, and certainly are not maintained until the "last of the serially-received message elements for the message have been transferred to the identified output circuit." Therefore, because the

part-time infringement doctrine cannot be applied in this unique case, there is no ^{FN22} literal infringement of the patent by IBM's products.

^{FN22} In addition to patent estoppel, IBM argues that TM is trying to stand the concept of independent and dependent claims on its head, by positing a situation in which the dependent claim was broader, not narrower, than its associated independent claim. It argues that, because the dependent claim covers both contention and non-contention situations, while the independent claim covers only non-contention situations, the dependent claim is broader than the independent claim.

Of course, it is well settled that a dependent patent claim must be narrower than its associated independent claim, see 35 U.S.C. § 112, ¶4, and must incorporate by reference all of the limitations of the independent claim from which it refers. See *Singer Elec. Inc. v. Tweeden-Bartholmeo Inc.*, 650 F.Supp. 444, 464 (S.D.N.Y.1986). However, IBM's superficially appealing argument is logically fallacious. A dependent claim may well be "narrower" (i.e., more restrictive) than its associated independent claim while nonetheless expanding on the type of situation in which the patent would be infringed. For example, suppose a patent has the following two claims:

1. An automobile having an engine, four wheels and a drive train for transmitting driving power to at least one opposed pair of said wheels.
2. An automobile as described in Claim 1 in which said drive train includes both forward and reverse gears and means for shifting between said gears to cause the driven wheels to be driven in either the forward or reverse direction as desired.

Obviously Claim 2 is narrower than Claim 1. Yet Claim 1 will be infringed by an automobile which can be driven only in the forward direction, while Claim 2 is infringed (only) by an automobile which can be driven

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in either direction.

Thus a narrower (dependent) claim may, and frequently does, cover a device capable of more types of operation (handling more "situations") than a device that would be covered by a broader (independent) claim.

*381 I emphasize that it is only because I reached my conclusion about the meaning of the phrase "for each message" and the reason for its use in the patent that I find no literal infringement by the pre-Springwood products. If I am wrong about the inapplicability of part-time infringement in this case, then I would have reached the opposite result, because no reasonable juror could possibly conclude that the patent was not literally infringed in non-contention cases. Indeed, I search IBM's voluminous papers in vain for a single suggestion that this is not the case.

Infringement by Equivalents

[24][25] Of course, a patent may be infringed otherwise than literally. Infringement by equivalents occurs when ever limitation of the claim is equivalently present in an accused device. See *Bennington Corp. v. Oronot-Warland, Inc.*, 833 F.2d 931, 934-35 (Fed.Cir.1987). Under the function-way-result test one considers whether the element of the accused device at issue performs substantially the same function, in substantially the same way, to achieve substantially the same result, as the limitation at issue in the claim. See *Hilton Davis Chem. Co. v. Warner-Jenkinson Co.*, 62 F.3d 1512, 1518 (Fed.Cir.1995) (en banc), *rev'd*, on other grounds, 520 U.S. 17, 117 S.Ct. 1040, 137 L.Ed.2d 146 (1997); *Graver Tank & Mfg. Co., Inc. v. Linde Air Prods. Co.*, 339 U.S. 605, 608, 70 S.Ct. 839, 856, 94 L.Ed. 1097 (1950). It is well-settled that a product does not infringe an invention by equivalents simply by performing the same function—it must do so in fundamentally the same way as is disclosed in the patent. As the United States Supreme Court held in its most recent discussion of the doctrine of equivalents, an over-broad definition of the concept of equivalence "conflicts with the definitional and public-notice functions of the statutory claiming requirement," such that the doctrine "was to be applied to individual elements of the claim, not to the invention as a whole." *Warner-Jenkinson Co. v.*

Hilton Davis Chemical Co., 520 U.S. at 29, 117 S.Ct. 1040. Thus, the doctrine of equivalents "prevents an accused infringer from avoiding infringement by changing only minor or insubstantial details of a claimed invention while retaining their essential functionality." *See Products, Inc. v. Devon Indus. Inc.*, 126 F.3d 1410, 1424 (Fed.Cir.1997).

Ordinarily, the issue of equivalence is for the jury. However, "Where the evidence is such that no reasonable jury could determine two elements to be equivalent, district courts are obliged to grant partial or complete summary judgment." *Warner-Jenkinson*, 520 U.S. at 39, n. 8, 117 S.Ct. 1040.

[36] On the undisputed facts before this Court, TM's claims of infringement by equivalents fare no better than did its claims of literal infringement. Indeed, the fact that TM makes these claims simply *382 underscores its belief that any message routing system employing wormhole routing will infringe its patent. I held in the *Markman* opinion that TM did not own the concept of wormhole routing. Therefore, it cannot bar IBM, or any other competitor, from coming up with a different wormhole routing system. And that is exactly what IBM has done here.

TM's argument can be summarized as follows: in or about 1924, scientists developed a system known as multiplexing, which reconstructs waves by using sampling points. Multiplexing permits several different messages to travel through the same wire at the same time. Different data in the wire relate to different messages, with particular sampling points containing data pertaining to Message A, different sampling points containing data comprising Message B, and so forth. The most obvious example of multiplexing is a telephone wire, which carries thousands of conversations simultaneously through the same medium, with the medium's logic set in such a way that each message is on a different time sequence. Thus, my call to you reaches your telephone receiver, while Bill's call to Jane reaches Jane's telephone receiver, even though they are carried over the same wire.

In a nutshell, TM claims that IBM employs a form of multiplexing to run messages from various input

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nodes through the central queue and on to their output nodes simultaneously (or virtually so). TM urges that IBM's use of multiplexing infringes its patent because each message is on an "exclusive path," that path being its own time sequence. As TM describes IBM's use of time multiplexing, each receiver in a multi-receiver system is allotted a recurring sequence of time cycles during which it can transmit a portion of a message over a single shared connection. TM insists that the sequential ordering of the receivers is on an unchanging pattern, thereby creating a "path" that is "established" and "maintained." TM has submitted affidavits from individuals who, for purposes of this motion will be deemed to be skilled in the art, in which those individuals purport to reconstruct what must be occurring inside IBM's central queue, based on their knowledge of the phenomenon of time-division multiplexing. That is the only evidence offered in support of TM's contention that the operation of the central queue results in the establishment and maintenance of a path.

IBM argues in response that TM is wrong, because TM's witnesses have guessed wrong about how the central queue works, and because the way the system actually does work is not equivalent to the teaching of the '773.

IBM is right on both counts.

There can be little question that the '773 patent does not teach multiplexing. Plaintiff admits that the concept has been known and used widely since the 1920s, yet there is no mention of it in the patent itself or the prosecution history. Nor did it come up at the Markman hearing.

Nonetheless, time multiplexing could qualify as an equivalent if it establishes and maintains discrete paths for each message, as long as it does so in fundamentally the same way that the '773 patent does. I must again emphasize this point: the fact that IBM's products transmit messages via wormhole routing is insufficient to warrant a finding of equivalence. Equivalence requires wormhole routing as taught by the '773 patent—via a path established at the outset of message transmission and maintained for the exclusive use of a particular message until the last bit of

data is received at its identified destination.

There is nothing in the record before me from which a reasonable juror could conclude that IBM's products, whether pre-Springwood or post-Springwood, accomplish that result. Indeed, on the record before me, I am constrained to agree with IBM that its chips cannot possibly be deemed the equivalent the invention claimed in the '773 patent, because, while they transmit messages via wormhole *383 routing, they do so in a way that is absolutely antithetical to the patent's disclosures.

As noted above, TM submits conclusory affidavits from individuals who understand time multiplexing. Those individuals draw conclusions about how IBM's queue works based on that understanding. IBM, however, submits affidavits from Craig Stunkel and Derrick L. Gormiro-peterson who work on the accused products—which establish that TM's witnesses are in error. IBM's products do not assign a recurring sequence of time slots over a single conductor to each individual message, as TM's witnesses hypothesize. Instead, the central queue, at both its input and output ports, operates in accordance with the aforementioned LRU algorithm. When additional message chunks simultaneously are received at additional receivers, the order in which receivers send chunks into the central queue is not sequential. Rather, the receiver that was not serviced for the longest time becomes the next one to be serviced. If this means that a chunk of new message needs to "cut in" ahead of a chunk belonging to a message that is already in transit, then in it cuts—and in doing so, it takes away the time slot to which the earlier message would otherwise have been "assigned." The more messages that arrive simultaneously or in close temporal proximity to one another, the more such interleaving takes place—and with each interleaving, the time sequence of each message then in the system changes.

The only competent evidence before me demonstrates that, far from establishing a fixed path (assuming *arguendo* that a time sequence could be a "path" within the meaning of the '773 patent claims—itself a highly dubious proposition ²⁰⁰²), IBM's switch operates in a manner that precludes any finding of a message's "path" being established at the out-

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not or maintained during transit for its exclusive use. Thus, its products do not operate in fundamentally the same way as the '773 patent does, and TMI's claim of infringement by equivalents must be dismissed.

FN23. At the *Martinez* hearing, the parties stipulated that a "path" consisted of a wire and its associated logic. I suppose it is possible that logic for assigning time sequences within a single wire to a particular message could constitute a "path" within that definition, although that is certainly not what the Court had in mind during the *Martinez* process. However, the process of message interleaving pursuant to the LRU algorithm used by IBM does not create a "path" that is either established or maintained within the *Martinez* definition.

I am buttressed in this conclusion by my reading of two recent Federal Circuit cases. For example, in *Hagerman All v. Dresser Industries, Inc.*, 9 F.3d 949 (Fed.Cir.1993), the Court of Appeals found no infringement by equivalents where both the patent and the allegedly infringing product performed the same overall function—promoting the rapid drying of refractory linings by reducing the risk of explosions—that did so "in a different way." The patent claim utilized elements that were hollow, which "provide in their natural state channels for the release of steam," and which were at least partly burned away during the process. The allegedly infringing products, by contrast, worked through capillary action, and the elemental fibers melted as the process worked, rather than being burned away. Similarly, in *Zodiac Pool Corp. Inc. v. Hofflager Industries, Inc.*, 206 F.3d 1408 (Fed.Cir.2000), the Court of Appeals affirmed judgment as a matter of law in favor of the accused infringer whose product did not embody a certain "clear structural limitation" in the patent in suit—namely, that a stop be located substantially inward of the peripheral edge of a disc. The Court ruled that, if infringement were allowed under the doctrine of equivalents, despite the substantial structural differences between the patent and defendant's product, the claim limitation would be reduced to a "functional abstract[] devoid of *384 meaningful limitations on which the public could rely." *Id.* at 1416 (quoting

Sege Products, 126 F.3d at 1424).

If the differences between the infringing products and the patents in suit in *Zodiac Pool* and *Hoganas* are sufficient to preclude application of the doctrine of equivalents as a matter of law, then there can be no question that summary judgment ought to be granted to IBM, given the utter lack of similarity between its process for the wormhole routing of messages and that disclosed in the '773 patent.

Accordingly, I rule that nothing in the record before me raises a disputed issue of material fact, and that IBM is entitled to a judgment of non-infringement as a matter of law. TMI's claims of patent infringement relating to the '773 patent are dismissed.

We will proceed to trial on the claimed infringement of the '342 patent only. The parties are directed to participate in a telephone conference related to scheduling on November 15 at 9 a.m.

This constitutes the decision and order of the Court.

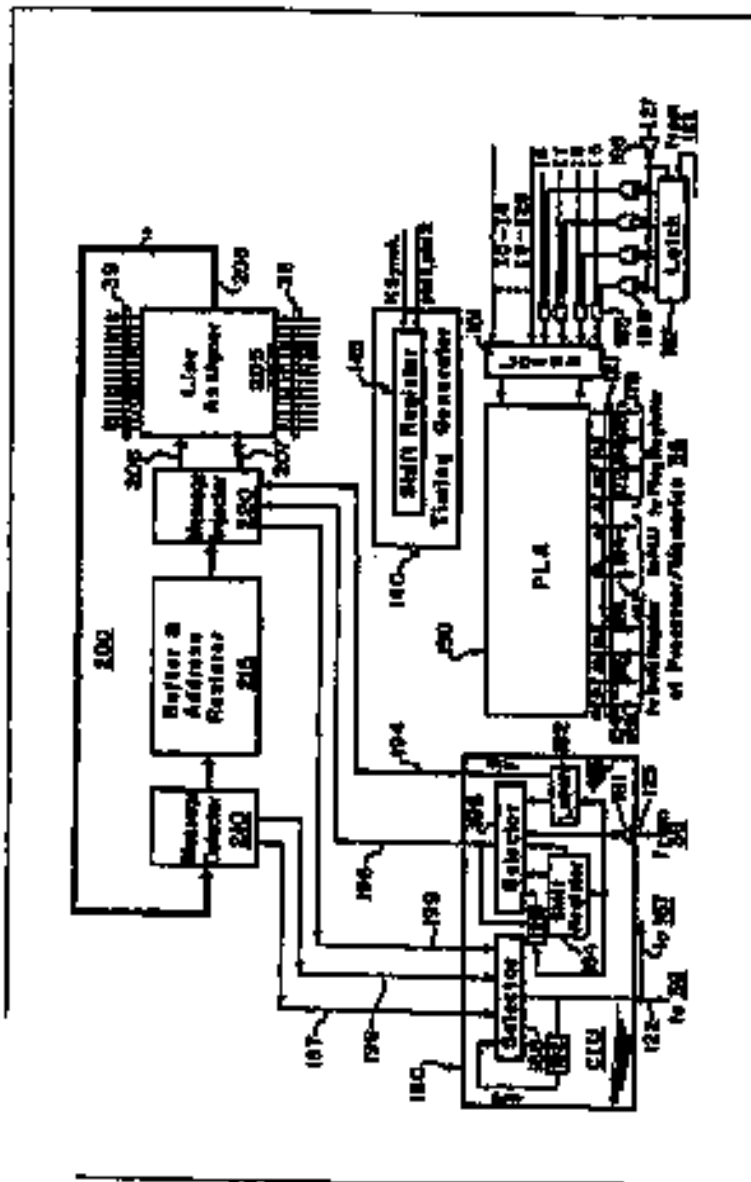
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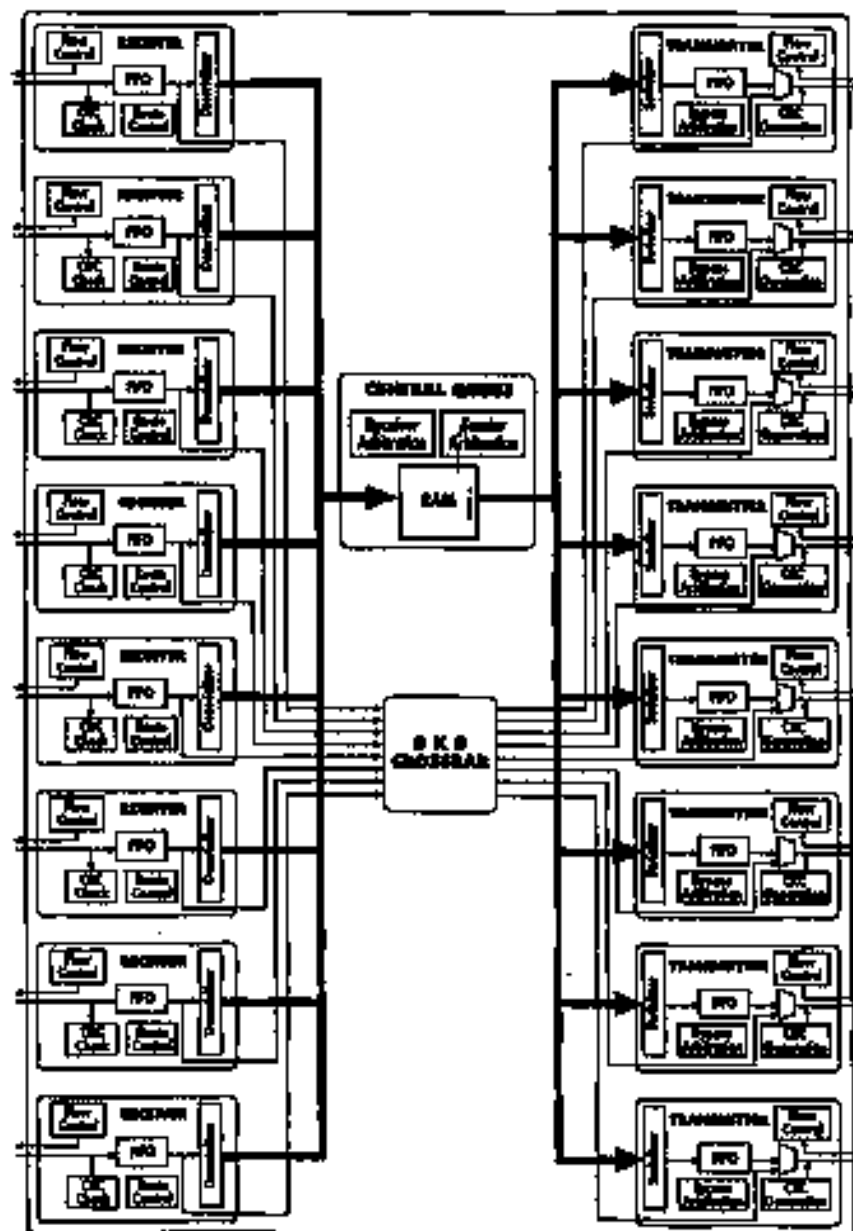
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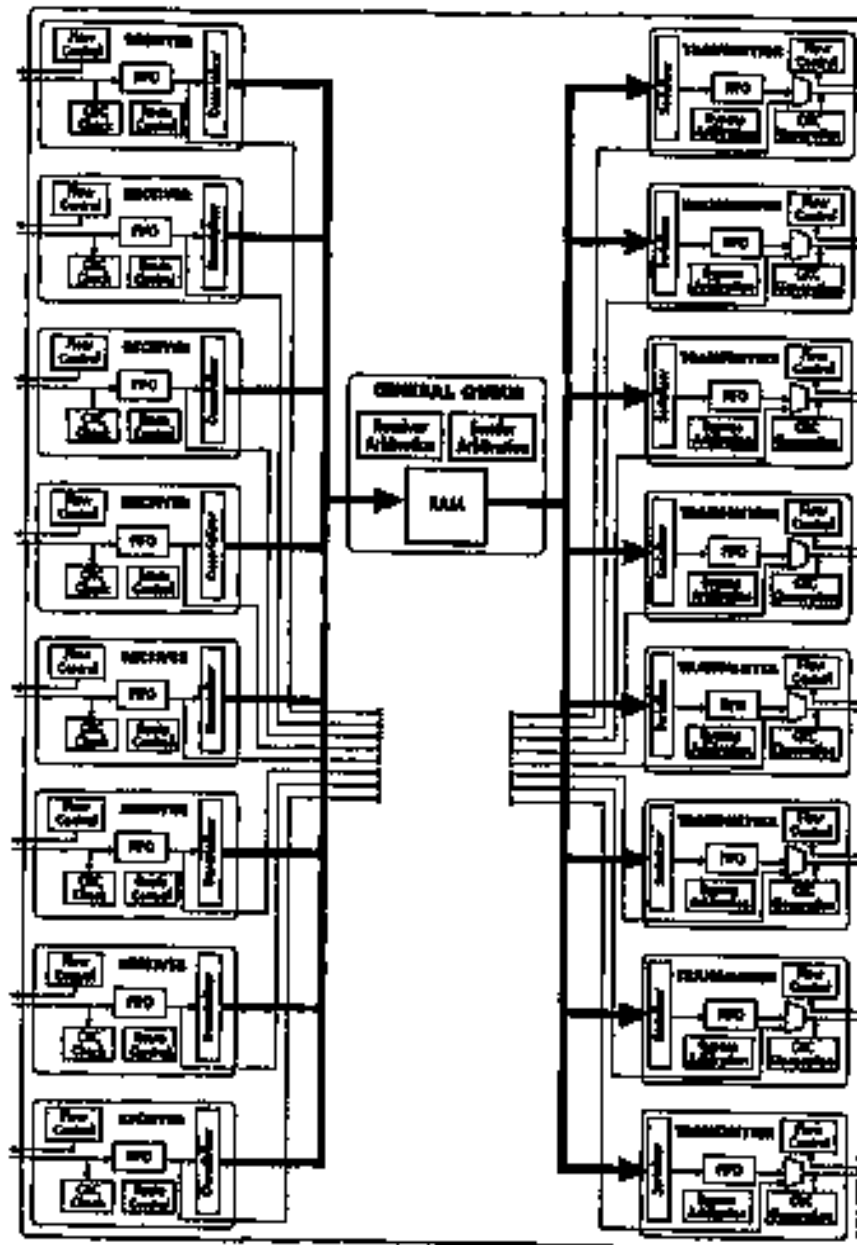
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* [7:97cv01529](#) (Docket) (Mar. 06, 1997)

END OF DOCUMENT

EXHIBIT 2



US005817207A

United States Patent [19]
Leighton

[11] **Patent Number:** **5,817,207**
[45] **Date of Patent:** **Oct. 6, 1998**

[54] **RADIO FREQUENCY IDENTIFICATION CARD AND HOT LAMINATION PROCESS FOR THE MANUFACTURE OF RADIO FREQUENCY IDENTIFICATION CARDS**

[78] **Inventor:** Keith R. Leighton, 2817 Palmer Rd., Lorain, Ohio 44053

[21] **Appl. No.:** 727,789

[22] **Filed:** Oct. 7, 1996

Related U.S. Application Data

[60] **Provisional application No. 60/005,685 Oct. 17, 1995.**

[51] **Int. Cl.*** B32B 31/26

[52] **U.S. Cl.** 156/298; 156/312

[58] **Field of Search** 156/380, 312, 156/311, 298

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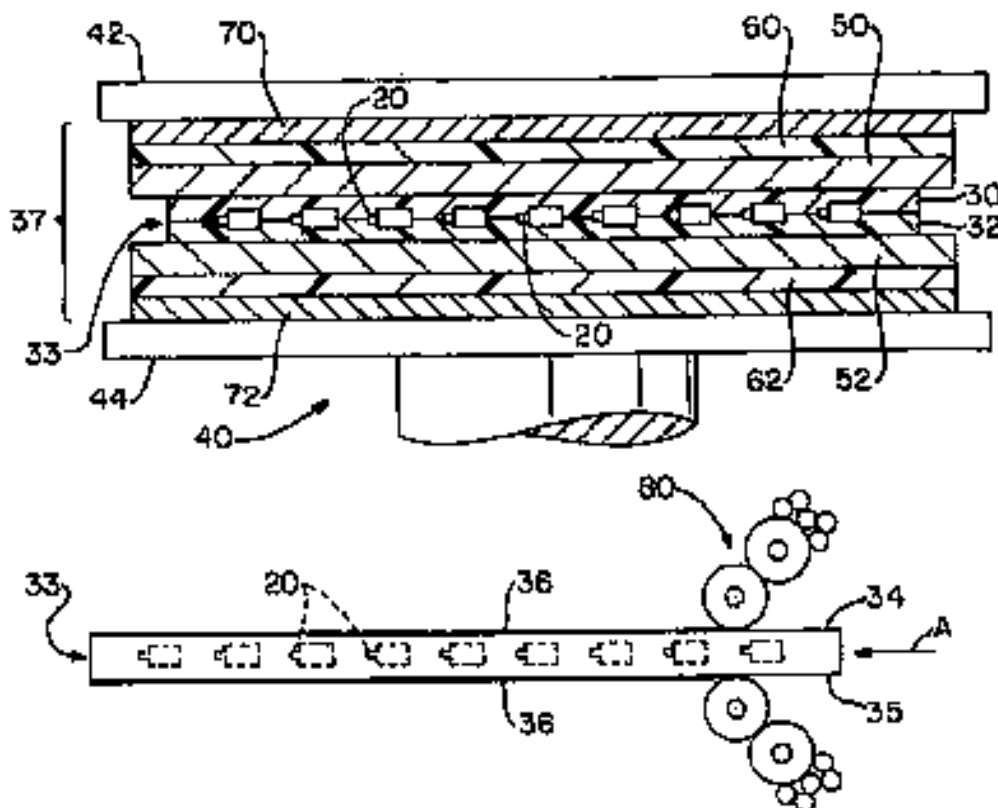
Primary Examiner—Francis J. Loch

Attorney, Agent, or Firm—Oldham & Oldham Co., L.P.A.

[57] ABSTRACT

A plastic card, such as a radio frequency identification card, including at least one electronic element embedded therein and a hot lamination process for the manufacture of radio frequency identification cards and other plastic cards including a micro-chip embedded therein. The process results in a card having an overall thickness in the range of 0.028 inches to 0.032 inches with a surface suitable for receiving dye sublimation printing—the variation in card thickness across the surface is less than 0.0005 inches. A card manufactured in accordance with the present invention also complies with all industry standards and specifications. Also, the hot lamination process of the present invention results in an substantially planar card. The invention also relates to a plastic card formed in accordance with the hot lamination process of the present invention.

17 Claims, 3 Drawing Sheets



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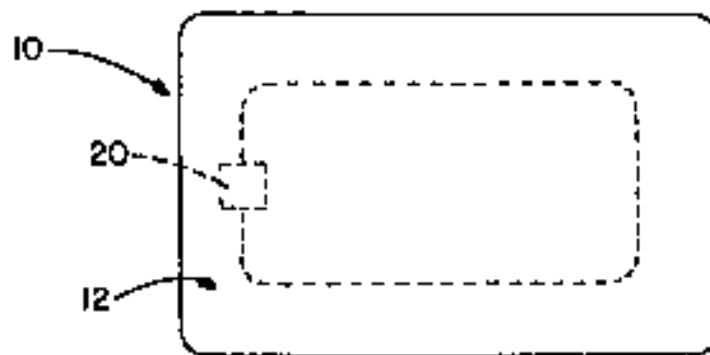


FIG. -1

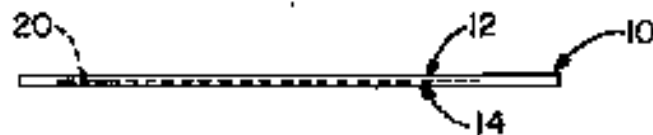


FIG. -2

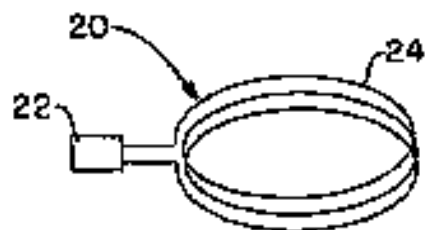


FIG. -3A

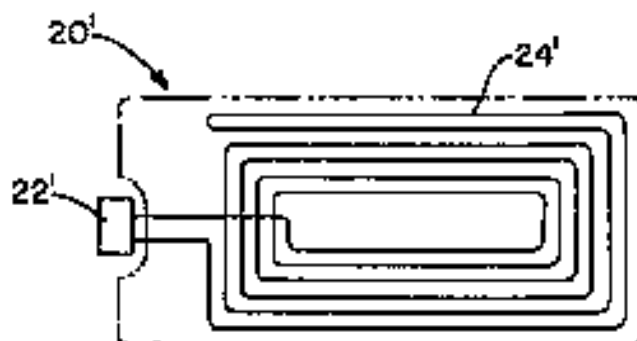


FIG. -3B

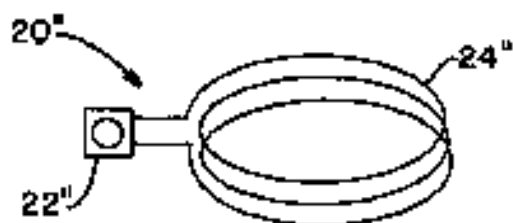


FIG. -3C

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FIG. - 4

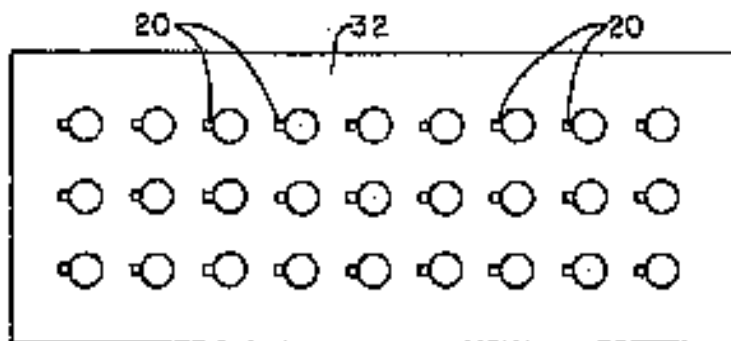


FIG. - 5

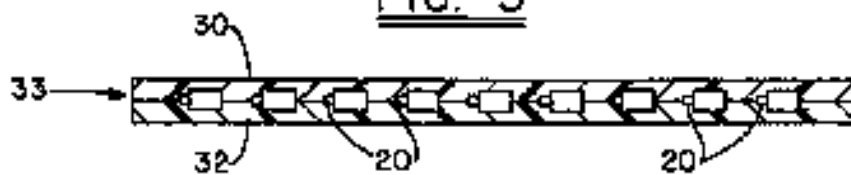


FIG. - 6

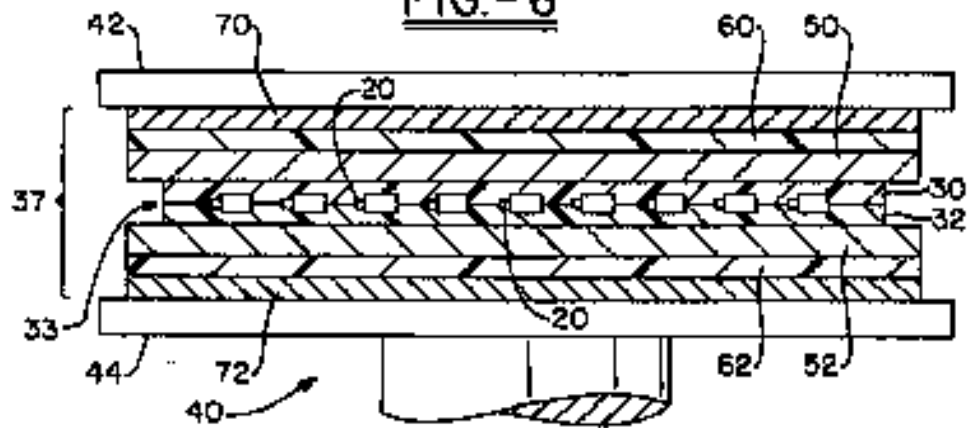


FIG. - 7

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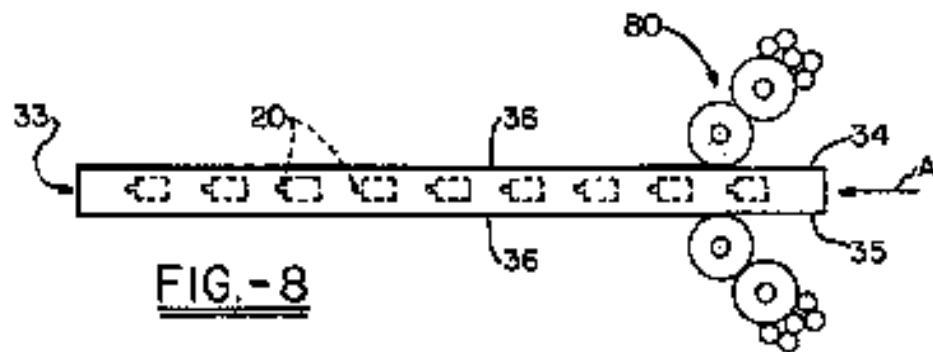


FIG.-8



FIG.-9

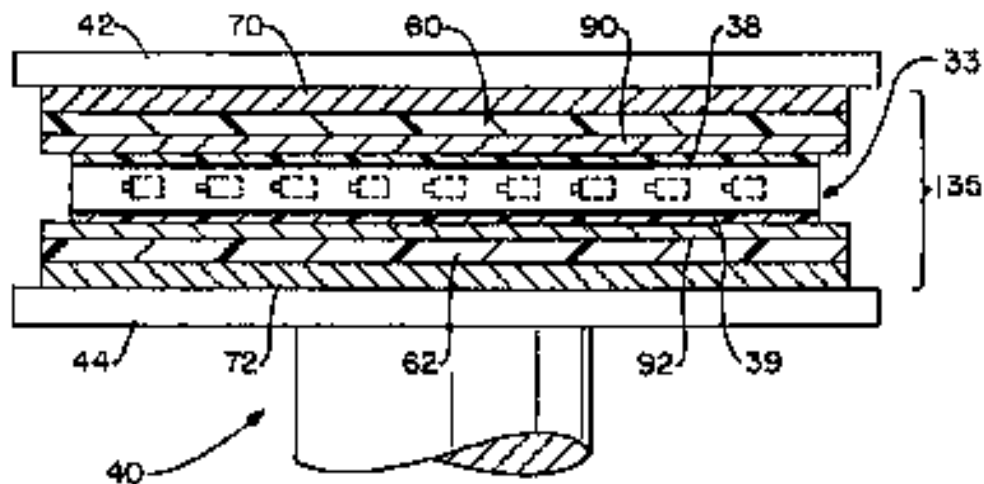


FIG. -10

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RADIO FREQUENCY IDENTIFICATION CARD AND HOT LAMINATION PROCESS FOR THE MANUFACTURE OF RADIO FREQUENCY IDENTIFICATION CARDS

This application claims the benefit of the following U.S. Provisional Application No.: 60/003,585, filing date Oct. 17, 1995.

FIELD OF THE INVENTION

The present invention relates generally to plastic cards and the manufacture thereof, and more particularly to radio frequency identification (RFID) cards and the manufacture of RFID cards that conform to industry size and performance standards and conventions and that have a superior outer surface to known RFID cards such that card may receive dye sublimation printing or the like.

BACKGROUND OF THE INVENTION

As the use of plastic cards for credit cards, automated teller machines (ATM) cards, identification cards, and like continues to become more widespread, the problems associated with the use of such cards correspondingly increase. Credit card fraud and identification card fraud are becoming larger problems everyday, and this fraud has introduced uncertainties into our systems of commerce and our security systems. Using easily available technology, criminals are able to manufacture credit/debit cards, ATM cards, identification cards, and the like having another's account code, identification code, or other personal information embedded in the magnetic stripe thereof. Thus, for example, criminals may steal hundreds or thousands of legitimate credit card account numbers and manufacture many additional cards bearing the stolen information. These fraudulent cards are then usable by the criminals to purchase goods and to receive cash with the legitimate card holder and the card issuer left holding the bill. Likewise, so called debit cards are becoming increasingly popular. These cards have stored thereon a certain amount of value for which the card owner has previously paid. For example, a subway rider may purchase a card good for 50 fares, with one fare being deducted from the card each time the owner rides the subway. Criminals have also been able to manipulate the data stored on these cards to defraud the machines and others.

The ease to which criminals have been able to manufacture and/or manipulate known cards results from the existence of the easily altered magnetic stripe storage medium used by known cards. These magnetic stripes are easily programmed and reprogrammed using commonly available technology. Thus, there has been found a need in the plastic card industry to provide a more secure plastic card that is very difficult or impossible to fraudulently manipulate. The most likely solution to the above-noted problems associated with known plastic cards is the RFID card and other cards including computer chips embedded therein rather than, or in addition to, a magnetic stripe. While these RFID cards and like have been found to be successful in preventing or limiting fraud, they are more difficult and expensive to manufacture relative to ordinary magnetic stripe cards. One of the biggest obstacles to the wide spread manufacture and use of RFID cards has been the inability of card manufacturers to manufacture an RFID card that meets all industry standards and specifications, such as those set by the International Standards Organization (ISO), that are sufficiently aesthetically pleasing (wherein the embedded electronics are

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hidden from view), and that have a sufficiently regular or flat surface such that one or both surfaces of the card may be printed on using the very popular and widespread dye sublimation technology. Known plastic cards with computer chips and like embedded therein are too thick to work in connection with existing card reading machinery (ATM machines, telephones, and like) and have a surface that is too irregular in property and consistently receive dye sublimation printing. Furthermore, prior attempts to manufacture a sufficiently thin plastic card including a computer chip embedded therein have resulted in a card with inferior aesthetic qualities such as the ability to see the embedded computer chip through the plastic.

SUMMARY OF THE INVENTION

The present invention is therefore directed to a plastic card having at least one electronic element embedded therein and to a hot lamination method for the manufacture of plastic cards including at least one electronic element therein. The card has an overall thickness in the range of 0.028 inches to 0.032 inches and comprises a plastic core having at least one electronic element embedded therein with at least one of the upper and lower surfaces of the core comprising a coating printed or otherwise applied thereon. An overlaminate film is preferably provided over the coated surface of the core and the resulting card has a variation in thickness across the surface thereof of no greater than approximately 0.0005 inches. The hot lamination method of the present invention comprises the steps of providing first and second plastic core sheets, positioning at least one electronic element between the first and second core sheets to thus form a core, and placing the core in a laminator and closing the laminator without applying laminator ram pressure to the core. A heat cycle is applied to the core sheet in the laminator thus liquefying or partially liquefying the sheets. The laminator ram pressure is then increased in combination with the heat. A cooling cycle is then applied to the core in the laminator, preferably with an associated increase in ram pressure, and the core is removed from the laminator. At least one surface of the core is then printed on using a printing press or similar printing apparatus, a sheet of overlaminate film is placed on at least one side of the core, and the core is then again placed in a laminator. A heat cycle is applied to the core with its overlaminate film, and a cooling cycle is thereafter applied, resulting in a sheet of plastic card stock from which one or more cards may be cut. The invention is also directed to a card manufactured in accordance with the above process which results in a plastic card having a thickness in the range of approximately 0.028 inches to 0.032 inches with a surface smoothness of at least approximately 0.0005 inches as is required by ISO and American National Standards Institute (ANSI) standards.

The present invention provides numerous advantages over known plastic cards and known plastic card manufacturing processes, including the formation of a plastic card with electronic elements such as a computer chip embedded therein with a pleasing aesthetic appearance, with a sufficiently smooth and regular surface such that the card may receive dye sublimation printing, and with sufficient durability and characteristics to comply with all industry specifications and standards.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of a plastic card in accordance with the present invention;

FIG. 2 is a side elevational view of the card shown in FIG. 1;

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FIGS. 3A-3C are top plan views of various electronic elements that may be embedded in a card in accordance with the present invention;

FIG. 4 is an exploded, schematic view of an electronic element positioned between two plastic core sheets to form a core;

FIG. 5 is a top plan view of a plurality of electronic elements positioned on a sheet of plastic core stock such that they may be covered by a smaller sheet of core stock;

FIG. 6 is a schematic cross-sectional view of one or more electronic elements positioned between sheets of plastic core stock;

FIG. 7 schematically illustrates a book comprising the core, as it is positioned in a laminator apparatus;

FIG. 8 schematically illustrates the core as it is being printed on after removal from the laminator using a printing press or similar printing apparatus;

FIG. 9 is a cross-sectional view schematically illustrating the application of an overlaminate film to at least one side of the core;

FIG. 10 schematically illustrates the core with overlaminate film, as it is placed in a laminator for final processing to form a sheet of card stock.

DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to a plastic card including at least one electronic element embedded therein. The present invention also relates to a hot lamination process for the manufacture of plastic cards, and more particularly to a hot lamination process for the manufacture of plastic cards that include an electronic element, such as a computer chip or other electronic element embedded therein. The electronic element may perform a wide variety of functions and take a wide variety of forms. Such cards, without regard to the particular electronic element embedded therein, will hereinafter be referred to as radio frequency identification (RFID) cards. The present invention also relates to a card formed in accordance with the invention.

Referring now to FIG. 1, there can be seen a plastic RFID card 10 manufactured in accordance with the present invention and including an electronic element 20 embedded therein. Card 10 includes an upper surface 12 and a lower surface 14. Electronic element 20 may take a wide variety of forms and perform a wide variety of functions. As shown in FIGS. 3A-3C respectively, electronic element 20, 20', 20'' may be provided by a micro-chip 22 including a wire antenna 24 connected thereto, a micro-chip 22' and a circuit board antenna 24', a read/write micro-chip 22'' and a wire coil antenna 24'', or any other suitable electronic element. These electronic elements 20, 20', 20'' and their insertion into plastic cards is not new, however, the present invention provides a new hot lamination process for manufacturing plastic cards 10 with these electronic elements 20, 20', 20'' embedded therein such that the cards 10 are of a superior quality, such that the cards 10 meet all ISO and other industry specifications and standards, in such that at least one of the upper and lower surfaces 12, 14 of card 10 is sufficiently smooth and is otherwise is capable of receiving dye sublimation printing. Specifically, a card in accordance with the present invention has a thickness of approximately in the range of 0.026 inches to 0.032 inches with a surface smoothness of 0.0005 inches.

As shown in FIGS. 4-10 one or more cards 10 in accordance with the present invention may be manufactured

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by positioning an electronic element 20 between first and second sheets of card stock 30, 32 to form a core 33. Preferably is shown in FIG. 5-10, a plurality of cards are manufactured simultaneously, in this, a plurality of electronic elements 20 are positioned between the first and second sheets of plastic core stock 30, 32 (only the second sheet 32 being shown in FIG. 5 for clarity). What a plurality of electronic elements 20 are positioned between first and second sheets plastic core stock 30, 32, electronic elements 20 are properly positioned relative to one another such that a plurality cards may be cut from the resulting card stock. Plastic core sheets 30, 32 may be provided by a wide variety of plastics, the preferred being polyvinyl chloride (PVC) having a thickness in the range of 0.007 inches to 0.024 inches and preferably having a thickness of approximately 0.0125 inches each. Those skilled in the art will recognize that the thickness of the plastic core sheets will depend upon the thickness of the one or more electronic elements that are to be embedded therebetween. Other suitable plastics that may be utilized include polyester, acrylonitrile-butadiene-styrene (ABS), and any other suitable plastic.

Subsequent to placing one or more electronic elements 20 between the first and second sheets 30, 32 of plastic core stock to form a core 33, this core 33 is placed in a laminator apparatus 40 of the type well known in the art of plastic card manufacturing. As is shown in FIG. 7, laminator 40 includes upper and lower platens 42, 44 for applying heat pressure to an article positioned therebetween. In addition to the ability to apply heat pressure, laminator 40 is preferably of the type having controlled platens 42, 44 that may provide both heat and chill cycles and preferably includes cycle timer to regulate cycle time. Core 33 is positioned between first and second laminating platens 50, 52, one of which is preferably made finished to provide laminated core 33 with at least one textured outer surface. First and second laminating pads 60, 62 are positioned outside of the laminating platens 50, 52, and first and second steel plates 70, 72 are likewise positioned outside of pads 60, 62 and the entire assembly forms a book 35 for being positioned in laminator 40 between platens 42, 44.

Once book 35 is positioned in laminator 40 as shown in FIG. 7, the first lamination cycle is initiated by closing laminator platens 42, 44, preferably applying little or no heat pressure to book 35. A laminator heat cycle is initiated, bringing the temperature of platens 42, 44 up to a range of 275° F. to 400° F., and most preferably up to a range of 300° F. to 370° F. for a period of greater than 5 minutes, and preferably in the range of 7 to 10 minutes. Once the heat cycle has been applied to the book 35 as is set forth above, the ram pressure of laminator 40 is increased to facilitate the flow of the plastic core sheets 30, 32 so that the one or more electronic elements 20 are encapsulated thereby, and so that sheets 30, 32 form a uniform core 33 (seen most clearly in FIGS. 8-10) with upper and lower surfaces 34, 35. As mentioned, the use of matte finished laminator platens 50, 52 provides surfaces 34, 35 with a slightly roughened or textured quality which will facilitate the application of a coating thereto as is discussed below. The ram pressure applied during the heat cycle and the length of the heat cycle may vary, depending sequentially upon the size of sheets 30, 32. For example, the cycle time may be in the range of 10-15 minutes. In one example, a ram pressure of 940.135 pounds per square inch (p.s.i.) was applied for 10-15 minutes to form a uniform core 33, using sheets 30, 32 of a size in the range of 12 inches by 24 inches to 24 inches by 36 inches.

Subsequent to the above heat cycle, laminator 40 applies a chill cycle to book 35 during which time the ram pressure

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of the laminator 40 is increased, preferably by approximately 25% until the plates 42,44 have cooled to approximately 40° F. to 65° F. for approximately 10-15 minutes. Core 33 only then be removed from laminator 40 for additional processing.

Subsequent to the removal of core 33 from laminator 40, and as illustrated in FIG. 8, core 33 is coated on at least one of its upper and lower surfaces 34, 35 with a layer of printing ink 36. This may be accomplished using a wide variety of printing techniques such as offset printing, letterpress printing, screen printing, roller coating, spray printing, litho-printing, and other suitable printing techniques. As shown in FIG. 8, core 33 is fed in the direction indicated with arrow A through a printing press, a lithographic printer, or a similar apparatus 38. This printing step is performed to coat at least one surface 34, 35 of core 33 with a layer of aesthetically pleasing ink 36. This layer of ink 36 conceals the one or more electronic elements 20 that are embedded within core 33, and prevents these one or more electronic elements 20 from showing through the relatively thin core 33. In this manner, the one or more electronic elements 20 encapsulated in core 33 are completely hidden from view without requiring the plastic used in the manufacture core 33 to be excessively thick.

Referring now to FIGS. 9-10, the final processing of core 33, which now comprises a layer of ink 36 on the last on at least one surface 34,35 thereof, is schematically illustrated. A layer of overlaminates film such as clear overlaminates film 38,39 is positioned on at least one ink coated surface 34,35 of core 33, and preferably core 33 is positioned between two similar sheets of overlaminates film 38,39 as shown. Overlaminates film is very thin, for example in the range of 0.0015" thick. A book 135 is then constructed for insertion into laminator 40 as is schematically illustrated FIG. 10. Book 135 comprising core 33, including at least one layer of ink 36 and at least one layer of overlaminates film 38, 39 is positioned between laminating plates which are preferably highly polished plates such as mirror finished stainless steel plates 64, 62. Book 135 also comprises first and second laminating pads 68, 62 and first and second steel plates 70, 72 as is discussed above in relation to FIG. 7.

When book 135 is positioned between upper and lower plates 42,44 of laminator 40 as shown in FIG. 10, the laminator is closed and a heat cycle in the range of 175° F. to 300° F., and most preferably in the range of 180° F. to 275° F., is applied to book 135 for a period of 10 to 25 minutes with a ram pressure that varies depending upon sheet size or the ram size of the laminator 40, but which is typically approximately 1000 p.s.i. with an 18 inch diameter ram. The laminator 40 is then opened to initiate a chill cycle, preferably with a corresponding increase in ram pressure. For example, the chill temperatures may be in the range of 40° F. to 65° F., and last for a period of 10 to 25 minutes. A ram pressure increase of approximately 25% over the pressure used for the heat cycle has been found to be most preferable.

Subsequent to the above described second lamination cycle as illustrated in FIG. 10, a sheet of plastic card stock is provided which comprises at least core 33 with at least one surface 34,35 thereof covered by a layer of ink 36, and with at least one surface 34,35 thereof covered by a layer of overlaminates film 38, 39. Preferably plastic card stock manufactured in accordance with the present invention comprises core 33 covered on both surfaces 34,35 with a layer of ink 36 which is positioned between layers of overlaminates film 38,39, all of which has been laminated together as described. One or more cards 10 then may be cut

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from the resulting plastic card stock and card 10 will have a thickness in the range of 0.028 inches to 0.032 inches with variation in overall thickness across the surfaces 12, 14 thereof being no greater than approximately 0.0005 inches.

The one or more cards 10 can thus be said to have a surface smoothness of approximately 0.0005 inches or better. Thus, a card 10 manufactured in accordance with the present invention includes at least one surface 12,14 at preferably both surfaces 12,14 that are sufficiently smooth and regular to receive dye sublimation printing.

Those skilled in the art will recognize that the foregoing description has set forth the preferred embodiment of the invention in particular detail and it must be understood that numerous modifications, substitutions, and changes may be undertaken without departing from the true spirit and scope of the present invention as defined by the ensuing claims.

What is claimed is:

1. A process for incorporating at least one electronic element in the manufacture of a plastic card, comprising the steps of:
 - (a) providing first and second plastic core sheets;
 - (b) positioning said at least one electronic element in the absence of a non-electronic carrier directly between said first and second plastic core sheets to form a core, said plastic core sheets defining a pair of inner and outer surfaces of said core;
 - (c) positioning said core in a laminator apparatus, and subjecting said core to a heat and pressure cycle, said heat and pressure cycle comprising the steps of:
 - (i) heating said core for a first period of time;
 - (ii) applying a first pressure to said core for a second period of time such that said at least one electronic element is encapsulated by said core;
 - (iii) cooling said core while applying a second pressure to said core;
 - (d) coating at least one of said outer surfaces of said core with a layer of ink; and
 - (e) applying a layer of overlaminates film to at least one of said outer surfaces of said core.
2. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 1, wherein said laminator apparatus has first and second laminating plates having a matte finish for creating a textured surface on at least one of said outer surfaces of said core.
3. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 2, wherein each of said first and second laminating plates has a matte finish for creating said textured surface on both of said outer surfaces of said core.
4. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 1, wherein said first and second plastic core sheets are made from a material selected from the group consisting of polyvinyl chloride, polyester, and acrylonitrile-butadiene-styrene, each of said sheets having a thickness in the range of 0.007 to 0.024 inch.
5. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 4, wherein said first and second plastic core sheets have a thickness of approximately 0.0125 inch.
6. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 1, wherein said second pressure is greater than said first pressure.

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7. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 6, wherein said second pressure is at least approximately 25% greater than said first pressure.

8. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 1, wherein said core is heated in step (c)(i) to a temperature in the range of 375° F. to 400° F. and said first period of time is at least five (5) minutes.

9. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 1, wherein said first pressure is approximately 1000 p.s.i. and said second period of time is at least 10 minutes.

10. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 1, wherein said step (d) is carried out utilizing a printing press.

11. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 1, wherein said step (d) is carried out utilizing a coating technique selected from the group consisting of silk screen printing, offset printing, letterpress printing, screen printing, roller coating, spray printing, and litho-printing.

12. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 1, wherein said step (a) of applying a layer of overlaminate film comprises the further steps of:

(a) positioning an overlaminate film on at least one ink coated surface of said core;

(b) subjecting said core to a second heat and pressure cycle comprising the steps of:

(i) heating said core to a temperature between approximately 175° F. to 300° F. for approximately 10 to 25 minutes;

(ii) applying approximately 1000 p.s.i. pressure to said core; and

(iii) cooling said core to a temperature in the range of approximately 40° F. to 65° F. for approximately 10 to 25 minutes.

13. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in

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claim 1, wherein said at least one electronic element is a micro-chip and an associated wire antenna.

14. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 1, wherein said at least one electronic element is a micro-chip and an associated circuit board antenna.

15. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 1, wherein said at least one electronic element is a read/write integrated chip and an associated antenna.

16. A hot lamination process for the manufacture of plastic cards, said process comprising the steps of:

(a) providing first and second plastic core sheets;

(b) positioning at least one electronic element in the absence of a non-electronic carrier directly between said first and second plastic core sheets to form a layered core;

(c) positioning said core in a laminator apparatus, and subjecting said core to a heat and pressure cycle, said heat and pressure cycle comprising the steps of:

(i) heating said core in said laminator, in the presence of a unilateral first ram pressure, to a temperature which causes controlled flow of said plastic which makes up said first and second plastic core sheets;

(ii) applying a second pressure uniformly across said core for encapsulating said at least one electronic element within said controlled flow plastic;

(iii) subsequently cooling said core in conjunction with the concurrent application of a third pressure uniformly across said core, said core including said upper and lower surfaces;

(d) printing on at least one of said upper and lower surfaces of said core such that a layer of ink is applied to at least a portion of said at least one upper and lower surface of said core.

17. The method as recited in claim 16 wherein said first and second core layers are devoid of any appreciable content.

* * * * *

EXHIBIT 3



US006214155B1

(12) **United States Patent**
Leighton

(10) **Patent No.:** **US 6,214,155 B1**

(45) **Date of Patent:** **Apr. 10, 2001**

(54) **RADIO FREQUENCY IDENTIFICATION CARD AND HOT LAMINATION PROCESS FOR THE MANUFACTURE OF RADIO FREQUENCY IDENTIFICATION CARDS**

(76) **Inventor:** Keith R. Leighton, 2817 Palmer Rd., Lorain, OH (US) 44053

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) **Appl. No.:** 09/155,390

(22) **Filed:** Sep. 22, 1998

Related U.S. Application Data

(63) Continuation of application No. 08/727,769, filed on Oct. 7, 1996, now Pat. No. 5,819,202.

(60) Provisional application No. 60/005,685, filed on Oct. 17, 1997.

(31) **Int. Cl.?** B32B 31/20

(52) **U.S. Cl.** 156/298; 156/312

(58) **Field of Search** 156/298, 312

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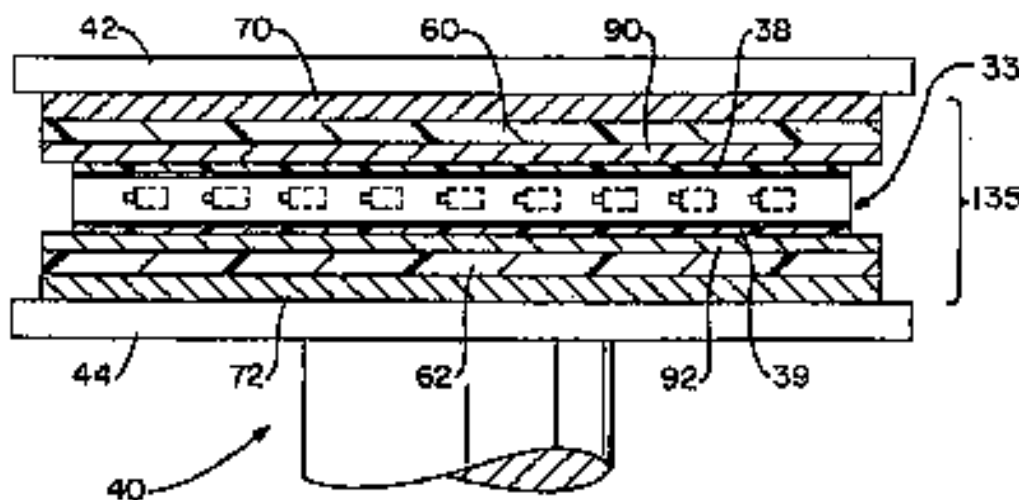
Primary Examiner—Francis J. Loria

(74) **Attorney, Agent, or Firm—**Oldham & Oldham Co., L.P.A.

(57) **ABSTRACT**

A plastic card, such as a radio frequency identification card, including at least one electronic element embedded therein and a hot lamination process for the manufacture of radio frequency identification cards and other plastic cards including a micro-chip embedded therein. The process results in a card having an overall thickness in the range of 0.028 inches to 0.032 inches with a surface suitable for receiving dye sublimation printing—the variation in card thickness across the surface is less than 0.0005 inches. A card manufactured in accordance with the present invention also complies with all industry standards and specifications. Also, the hot lamination process of the present invention results in an acoustically pleasing card. The invention also relates to a plastic card formed in accordance with the hot lamination process of the present invention.

16 Claims, 3 Drawing Sheets



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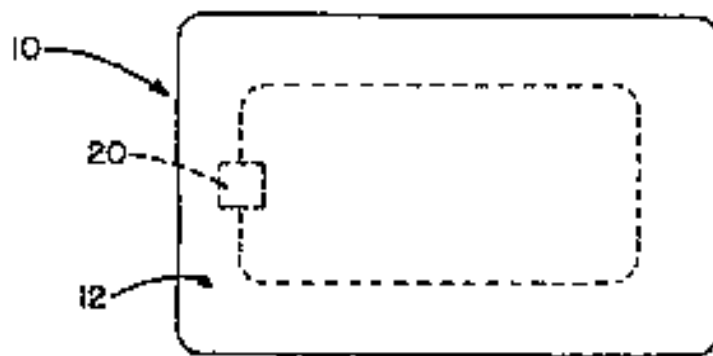


FIG. - 1



FIG. - 2

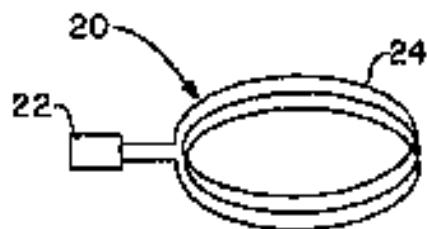


FIG. - 3A

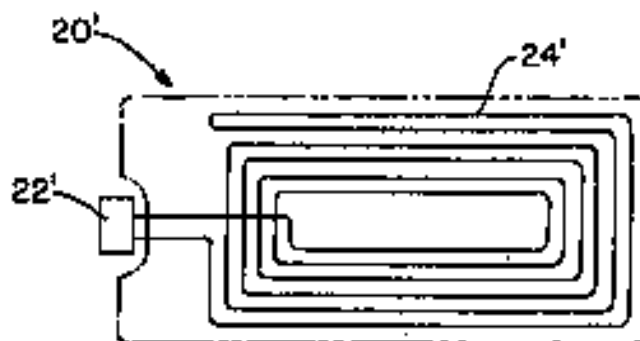


FIG. - 3B

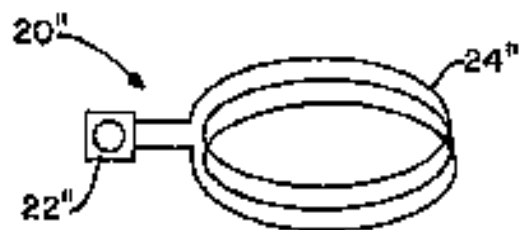


FIG. - 3C

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FIG. - 4

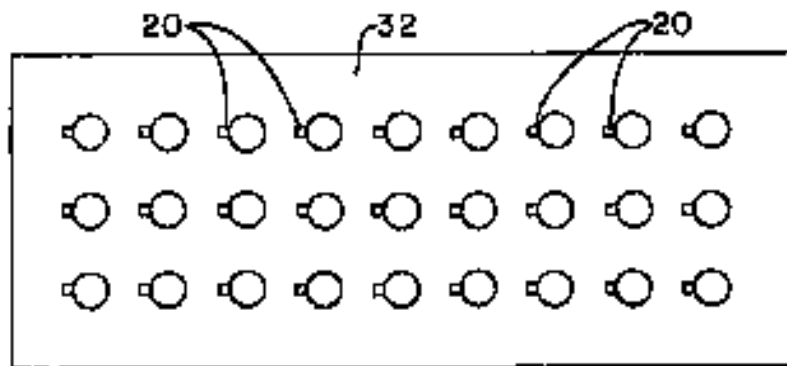


FIG. - 5

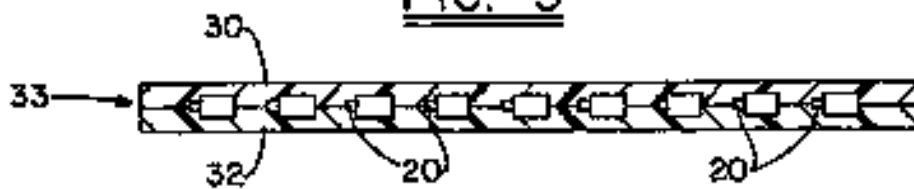


FIG. - 6

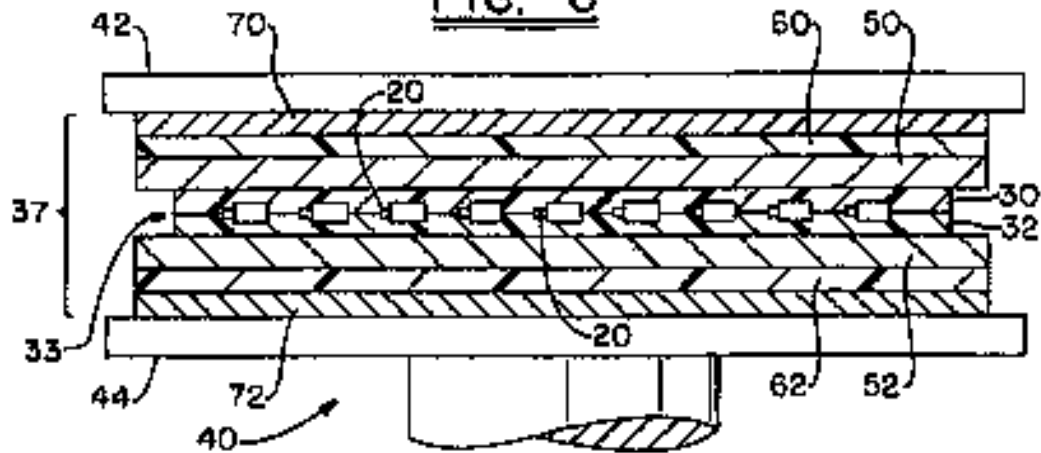


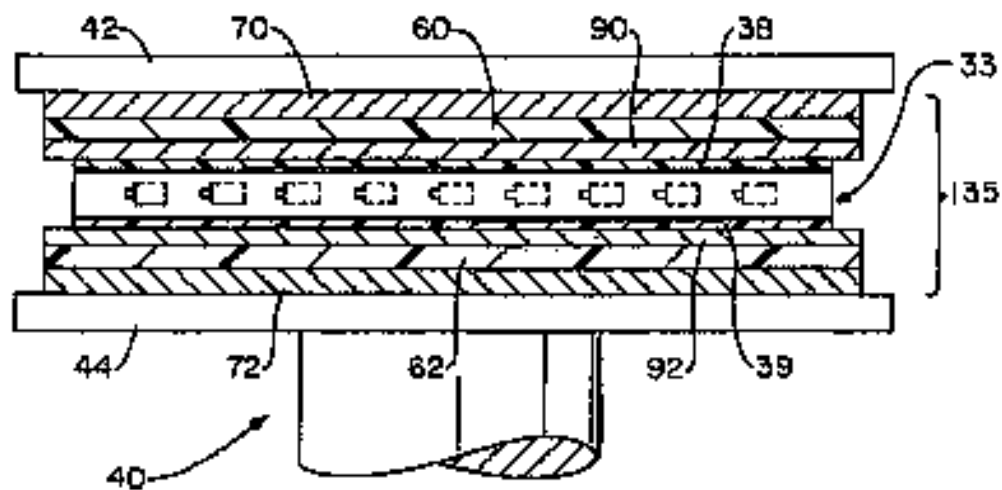
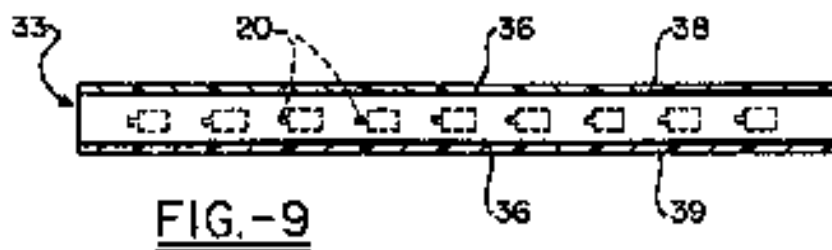
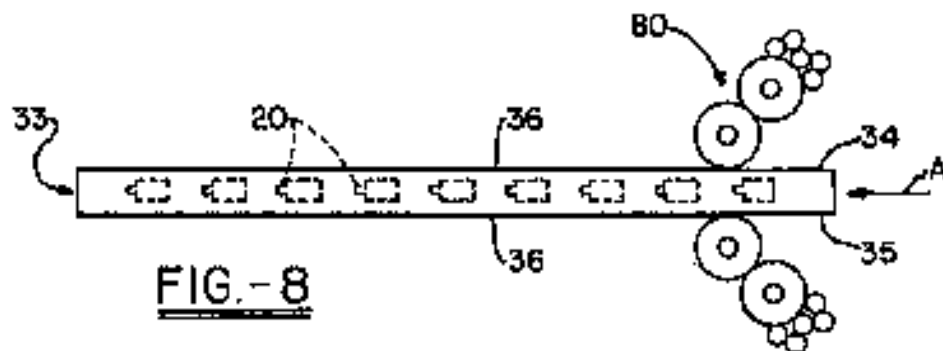
FIG. - 7

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RADIO FREQUENCY IDENTIFICATION CARD AND HOT LAMINATION PROCESS FOR THE MANUFACTURE OF RADIO FREQUENCY IDENTIFICATION CARDS

This application is a continuation of Ser. No. 08/727,799, now U.S. Pat. No. 5,817,207 which claims the benefit of provision of application 60/005,685 filed on Oct. 17, 1995.

FIELD OF THE INVENTION

The present invention relates generally to plastic cards and the manufacture thereof, and more particularly to radio frequency identification (RFID) cards and the manufacture of RFID cards that conform to industry sizes and performance standards and conventions and that have a superior outer surface to known RFID cards such that card may receive dye sublimation printing or the like.

BACKGROUND OF THE INVENTION

As the use of plastic cards for credit cards, automated teller machines (ATM) cards, identification cards, and like continues to become more widespread, the problems associated with the use of such cards correspondingly increase. Credit card fraud and identification card fraud are becoming larger problems everyday, and this trend has introduced uncertainties into our systems of commerce and our security systems. Using easily available technology, criminals are able to manufacture credit/debit cards, ATM cards, identification cards, and the like having another's account data, identification code, or other personal information embodied in the magnetic stripe thereof. Thus, for example, criminals may steal hundreds or thousands of legitimate credit card account numbers and manufacture many additional cards bearing the stolen information. These fraudulent cards are then usable by the criminals to purchase goods and to receive cash with the legitimate card holder and the card issuer left holding the bill. Likewise, so called debit cards are becoming increasingly popular. These cards have stored thereon a certain amount of value for which the card owner has previously paid. For example, a midway clerk may purchase a card good for 50 fares, with one fare being deducted from the card each time the owner rides the subway. Criminals have also been able to manipulate the data stored on these cards to defraud the merchants and others.

The ease in which criminals have been able to manufacture and/or manipulate known cards results from the existence of the easily altered magnetic stripe storage medium used by known cards. These magnetic stripes are easily programmed and reprogrammed using commonly available technology. Thus, there has been found a need in the plastic card industry to provide a more secure plastic card that is very difficult or impossible to fraudulently manipulate. The most likely solution to the above-noted problems associated with known plastic cards is the RFID card and other cards including computer chips embedded therein rather than, or in addition to, a magnetic stripe. While these RFID cards and like have been found to be successful in preventing or limiting fraud, they are more difficult and expensive to manufacture relative to ordinary magnetic stripe cards. One of the biggest obstacles to the wide spread manufacture and use of RFID cards has been the inability of card manufacturers to manufacture an RFID card that meets all industry standards and specifications, such as those set by the International Standards Organization (ISO), that are sufficiently aesthetically pleasing (wherein the embedded electronics are

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hidden from view), and that have a sufficiently regular or flat surface such that one or both surfaces of the card may be printed on using the very popular and widespread dye sublimation technology. Known plastic cards with computer chips and like embedded therein are too thick to work in connection with existing card reading machinery (ATM machines, telephones, and like) and have a surface that is too irregular to properly and consistently receive dye sublimation printing. Furthermore, prior attempts to manufacture a sufficiently thin plastic card including a computer chip embedded therein have resulted in a card with inferior aesthetic qualities such as the ability to see the embedded computer chip through the plastic.

SUMMARY OF THE INVENTION

The present invention is therefore directed to a plastic card having at least one electronic element embedded therein and to a hot lamination method for the manufacture of plastic cards including at least one electronic element therein. The card has an overall thickness in the range of 0.025 inches to 0.032 inches and comprises a plastic core having at least one electronic element embedded therein with at least one of the upper and lower surfaces of the core comprising a coating printed or otherwise applied thereon. An overlaminate film is preferably provided over the coated surface of the core and the resulting card has a variation in thickness across the surfaces thereof of no greater than approximately 0.0005 inches. The hot lamination method of the present invention comprises the steps of providing first and second plastic core sheets, positioning at least one electronic element between the first and second core sheets to thus form a core, and placing the core in a laminator and closing the laminator without applying laminator ram pressure to the core. A heat cycle is applied to the core sheets in the laminator thus liquefying or partially liquefying the sheets. The laminator ram pressure is then increased in combination with the heat. A cooling cycle is then applied to the core in the laminator, preferably with an associated increase in ram pressure, and the core is removed from the laminator. At least one surface of the core is then printed on using a printing press or similar printing apparatus, a sheet of overlaminate film is placed on at least one side of the core, and the core is then again placed in a laminator. A heat cycle is applied to the core with its overlaminate film, and a cooling cycle is thereafter applied, resulting in a sheet of plastic card stock from which one or more cards may be cut. The invention is also directed to a card manufactured in accordance with the above process which results in a plastic card having a thickness in the range of approximately 0.028 inches to 0.032 inches with a surface smoothness of at least approximately 0.0005 inches as is required by ISO and American National Standards Institute (ANSI) standards.

The present invention provides numerous advantages over known plastic cards and known plastic card manufacturing processes, including the formation of a plastic card with electronic elements such as a computer chip embedded therein with a pleasing, aesthetic appearance, with a sufficiently smooth and regular surface such that the card may receive dye sublimation printing, and with sufficient durability and characteristics to comply with all industry specifications and standards.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of a plastic card in accordance with the present invention;

FIG. 2 is a side elevational view of the card shown in FIG. 1;

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FIGS. 3A-3C are top plan views of various electronic elements that may be embedded in a card in accordance with the present invention;

FIG. 4 is an exploded, schematic view of an electronic element positioned between two plastic core sheets to form a core;

FIG. 5 is a top plan view of a plurality of electronic elements positioned on a sheet of plastic core stock such that they may be covered by a similar sheet of core stock;

FIG. 6 is a schematic cross-sectional view of one or more electronic elements positioned between sheets of plastic core stock;

FIG. 7 schematically illustrates a book comprising the core, as it is positioned in a laminator apparatus;

FIG. 8 schematically illustrates the core as it is being printed on after removal from the laminator using a printing press or similar printing apparatus;

FIG. 9 is a cross-sectional view schematically illustrating the application of an overlaminate film to at least one side of the core;

FIG. 10 schematically illustrates the core with overlaminate film, as it is placed in a laminator for final processing to form a sheet of card stock.

DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to a plastic card including at least one electronic element embedded therein. The present invention also relates to a hot lamination process for the manufacture of plastic cards, and more particularly to a hot lamination process for the manufacture of plastic cards that include an electronic element, such as a computer chip or other electronic element embedded therein. The electronic elements may perform a wide variety of functions and take a wide variety of forms. Such cards, without regard to the particular electronic element embedded therein, will hereinafter be referred to as radio frequency identification (RFID) cards. The present invention also relates to a card formed in accordance with the invention.

Referring now to FIG. 1, there can be seen a plastic RFID card 10 manufactured in accordance with the present invention and including an electronic element 20 embedded therein. Card 10 includes an upper surface 12 and a lower surface 14. Electronic element 20 may take a wide variety of forms and perform a wide variety of functions. As shown in FIGS. 1A-1C respectively, electronic element 20, 20', 20'' may be provided by a micro-chip 22 including a wire antenna 24 connected thereto, a micro-chip 22' and a circuit board antenna 24', a read/write micro-chip 22'' and a wire coil antenna 24'', or any other suitable electronic element. These electronic elements 20, 20', 20'' and their insertion into plastic cards is not new; however, the present invention provides a new hot lamination process for manufacturing plastic cards 10 with these electronic elements 20, 20', 20'' embedded therein such that the cards 10 are of a superior quality, such that the cards 10 meet all ISO and other industry specifications and standards, in much that at least one of the upper and lower surfaces 12, 14 of card 10 is sufficiently smooth and is otherwise is capable of receiving dye sublimation printing. Specifically, a card in accordance with the present invention has a thickness of approximately in the range of 0.028 inches to 0.032 inches with a surface smoothness of 0.0005 inches.

As shown in FIGS. 4-10 one or more cards 10 in accordance with the present invention may be manufactured

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by positioning an electronic element 20 between first and second sheets of card stock 30, 32 to form a core 33. Preferably as shown in FIGS. 5-10, a plurality of cards are manufactured simultaneously, in that, a plurality of electronic elements 20 are positioned between the first and second sheets of plastic core stock 30, 32 (only the second sheet 32 being shown in FIG. 5 for clarity). When a plurality of electronic elements 20 are positioned between first and second sheets plastic core stock 30, 32, electronic elements 20 are properly positioned relative to one another such that a plurality of cards may be cut from the resulting card stock. Plastic core sheets 30, 32 may be provided by a wide variety of plastics, the preferred being polyvinyl chloride (PVC) having a thickness in the range of 0.027 inches to 0.028 inches and preferably having a thickness of approximately 0.025 inches each. Those skilled in the art will recognize that the thickness of the plastic core sheets will depend upon the thickness of the one or more electronic elements that are to be embedded therebetween. Other suitable plastics that may be utilized include polyester, acrylonitrile-butadiene-styrene (ABS), and any other suitable plastic.

Subsequent to placing one or more electronic elements 20 between the first and second sheets 30, 32 of plastic core stock to form a core 33, this core 33 is placed in a laminator apparatus 40 of the type well known in the art of plastic card manufacturing. As is shown in FIG. 7, laminator 40 includes upper and lower platens 42, 44 for applying ram pressure to an article positioned therebetween. In addition to the ability to apply ram pressure, laminator 40 is preferably of the type having controlled platens 42, 44 that may provide both heat and chill cycles and preferably includes cycle timer to regulate cycle time. Core 33 is positioned between first and second laminating plates 50, 52, one of which is preferably made finished to provide laminated core 33 with at least one finished outer surface. First and second laminating plates 60, 62 are positioned outside of the laminating plates 50, 52, and first and second steel plates 70, 72 are likewise positioned outside of pairs of 60, 62 and the entire assembly forms a book 35 for being positioned in laminator 40 between platens 42, 44.

Once book 35 is positioned in laminator 40 as shown in FIG. 7, the first lamination cycle is initiated by closing laminator platens 42, 44, preferably applying little or no ram pressure to book 35. A laminator heat cycle is initiated, bringing the temperature of platens 42, 44 up to a range of 275° F. to 400° F., and most preferably up to a range of 300° F. to 370° F. for a period of greater than 5 minutes, and preferably in the range of 7 to 10 minutes. Once the heat cycle has been applied to the book 35 as is set forth above, the ram pressure of laminator 40 is increased to facilitate the flow of the plastic core sheets 30, 32 so that the one or more electronic elements 20 are encapsulated there by, and so that sheets 30, 32 form a uniform core 33 (seen most clearly in FIGS. 8-10) with upper and lower surfaces 34, 36. As mentioned, the use of made finished laminator plates 50, 52 provides surfaces 34, 36 with a slightly roughened or textured quality which will facilitate the application of a coating thereto as is discussed below. The ram pressure applied during the heat cycle and the length of the heat cycle may vary, depending especially upon the size of sheets 30, 32. For example, the cycle time may be in the range of 10-15 minutes. In one example, a ram pressure of 940.135 pounds per square inch (p.s.i.) was applied for 10-15 minutes to form a uniform core 33, using sheets 30, 32 of a size in the range of 12 inches by 24 inches to 24 inches by 36 inches.

Subsequent to the above heat cycle, laminator 40 applies a chill cycle to book 35 during which time the ram pressure

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of the lamination 40 is increased, preferably by approximately 25% until the plates 42, 44 have cooled to approximately 40° F. to 65° F. for approximately 10-15 minutes. Core 33 may then be removed from laminator 40 for additional processing.

Subsequent to the removal of core 33 from laminator 40, and as illustrated in FIG. 8, core 33 is coated on at least one of its upper and lower surfaces 34, 35 with a layer of printing ink 36. This may be accomplished using a wide variety of printing techniques such as offset printing, letterpress printing, screen printing, roller coating, spray printing, litho-printing, and other suitable printing techniques. As shown in FIG. 8, core 33 is fed in the direction indicated with arrow A through a printing process, a lithographic printer, or a similar apparatus 49. This printing step is performed to coat at least one surface 34, 35 of core 33 with a layer of substantially planar ink 36. This layer of ink 36 conceals the one or more electronic elements 28 that are embedded within core 33, and prevents these one or more electronic elements 28 from showing through the relatively thin core 33. In this manner, the one or more electronic elements 28 encapsulated in core 33 are completely hidden from view without requiring the plastic used in the manufacture of core 33 to be excessively thick.

Referring now to FIGS. 9-10, the final processing of core 33, which now comprises a layer of ink 36 on at least one surface 34, 35 thereof, is schematically illustrated. A layer of overlaminates film such as clear overlaminates film 38, 39 is positioned on at least one ink coated surface 34, 35 of core 33, and preferably core 33 is positioned between two similar sheets of overlaminates film 38, 39 as shown. Overlaminates film is very thin, for example in the range of 0.0015" thick. A book 135 is then constructed for insertion into laminator 40 as is schematically illustrated FIG. 10. Book 135 comprising core 33, including at least one layer of ink 36 and at least one layer of overlaminates film 38, 39 is positioned between laminating plates which are preferably highly polished plates such as mirror finished stainless steel plates 40, 42. Book 135 also comprises first and second laminating pads 40, 42 and first and second steel plates 70, 72 as is discussed above in relation to FIG. 7.

When book 135 is positioned between upper and lower plates 42, 44 of laminator 40 as shown in FIG. 10, the laminator is closed and a heat cycle in the range of 175° F. to 300° F., and most preferably in the range of 180° F. to 275° F., is applied to book 135 for a period of 10 to 25 minutes with a heat pressure that varies depending upon sheet size or the run size of the laminator 40, but which is typically approximately 1000 p.s.i. with an 18 inch diameter ram. The laminator 40 is then caused to execute a chill cycle, preferably with a corresponding increase in ram pressure. For example, the chill temperature may be in the range of 40° F. to 65° F. and last for a period of 10 to 25 minutes. A ram pressure increase of approximately 25% over the pressure used for the heat cycle has been found to be most preferable.

Subsequent to the above described second lamination cycle as illustrated in FIG. 10, a sheet of plastic card stock is provided which comprises at least core 33 with at least one surface 34, 35 thereof covered by a layer of ink 36, and with at least one surface 34, 35 thereof covered by a layer of overlaminates film 38, 39. Preferably plastic card stock manufactured in accordance with the present invention comprises core 33 covered on both surfaces 34, 35 with a layer of ink 36 which is positioned between layers of overlaminates film 38, 39, all of which has been laminated together as described. One or more cards 10 then may be cut

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from the resulting plastic card stock and card 10 will have a thickness in the range of 0.028 inches to 0.032 inches with variation in overall thickness across the surfaces 12, 14 thereof being no greater than approximately 0.0005 inches.

The one or more cards 10 can then be said to have a surface smoothness of approximately 0.0005 inches or better. Thus, a card 10 manufactured in accordance with the present invention includes at least one surface 12, 14 that is preferably both surfaces 12, 14 that are sufficiently smooth and regular to receive dye sublimation printing.

Those skilled in the art will recognize that the foregoing description has set forth the preferred embodiment of the invention in particular detail and it must be understood that numerous modifications, substitutions, and changes may be undertaken without departing from the true spirit and scope of the present invention as defined by the ensuing claims.

What is claimed is:

1. A process for incorporating at least one electronic element in the manufacture of a plastic card, comprising the steps of:

- (a) providing first and second plastic core sheets;
- (b) positioning said at least one electronic element in the absence of a non-electronic carrier directly between said first and second plastic core sheets to form a core, said plastic core sheets defining a pair of inner and outer surfaces of said core;
- (c) positioning said core in a laminator apparatus, and subjecting said core to a heat and pressure cycle, said heat and pressure cycle comprising the steps of:
 - (i) heating said core for a first period of time;
 - (ii) applying a first pressure to said core for a second period of time such that said at least one electronic element is encapsulated by said core;
 - (iii) cooling said core while applying a second pressure to said core;
- (d) applying a layer of overlaminates film to at least one of said outer surfaces of said core.

2. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 1, wherein said laminator apparatus has first and second laminating plates, at least one of said first and second laminating plates having a mirror finish for creating a textured surface on at least one of said outer surfaces of said core.

3. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 2, wherein each of said first and second laminating plates has a mirror finish for creating said textured surface on both of said outer surfaces of said core.

4. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 1, wherein said first and second plastic core sheets are made from a material selected from the group consisting of polyvinyl chloride, polyester, and acrylonitrile-butadiene-styrene, each of said sheets having a thickness in the range of 0.007 to 0.024 inch.

5. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 4, wherein said first and second plastic core sheets have a thickness of approximately 0.0125 inch.

6. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 1, wherein said second pressure is greater than said first pressure.

7. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in

US 6,214,155 B1

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claim 6, wherein said second pressure is at least approximately 25% greater than said first pressure.

8. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 1, wherein said core is heated in step (c)(i) to a temperature in the range of 275° F. to 400° F. and said first period of time is at least five (5) minutes.

9. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 1, wherein said first pressure is approximately 1000 p.s.i. and said second period of time is at least 10 minutes.

10. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 3, wherein said step (d) of applying a layer of overlaminate film comprises the further steps of:

- (a) positioning an overlaminate film on at least one surface of said core;
- (b) subjecting said core to a second heat and pressure cycle comprising the steps of:
 - (i) heating said core to a temperature between approximately 175° F. to 300° F. for approximately 10 to 25 minutes;
 - (ii) applying approximately 1000 p.s.i. pressure to said core, and
 - (iii) cooling said core to a temperature in the range of approximately 40° F. to 65° F. for approximately 10 to 25 minutes.

11. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 1, wherein said at least one electronic element is a micro-chip and an associated wire antenna.

12. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in

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claim 1, wherein said at least one electronic element is a micro-chip and an associated circuit board antenna.

13. The process for incorporating at least one electronic element in the manufacture of a plastic card as recited in claim 1, wherein said at least one electronic element is a read/write integrated chip and an associated antenna.

14. A plastic card constructed in accordance with claim 1.

15. A hot lamination process for the manufacture of plastic cards, said process comprising the steps of:

- (a) providing first and second plastic core sheets;
- (b) positioning at least one electronic element in the absence of a non-electronic carrier directly between said first and second plastic core sheets to form a layered core;
- (c) positioning said core in a laminator apparatus, and subjecting said core to a heat and pressure cycle, said heat and pressure cycle comprising the steps of:
 - (i) heating said core in said laminator, in the presence of a minimal first ram pressure, to a temperature which causes controlled flow of said plastic which makes up said first and second plastic core sheets;
 - (ii) applying a second pressure uniformly across said core for encapsulating said at least one electronic element within said controlled flow plastic;
 - (iii) subsequently cooling said core in conjunction with the concurrent application of a third pressure uniformly across said core, said core including and upper and lower surfaces.

16. The method as recited in claim 15 wherein said first and second core layers are devoid of any appreciable contour.

• • • • •

EXHIBIT 4

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

LEIGHTON TECHNOLOGIES LLC,

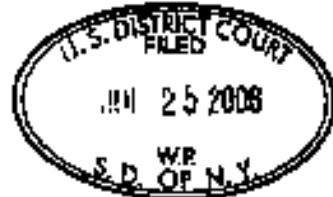
Plaintiff,

-against-

OBERTHUR CARD SYSTEMS, S.A.,
AND OBERTHUR CARD SYSTEMS OF
AMERICA CORPORATION,

Defendants.

Case No. 04-CV-02496 (CM)(LMS)



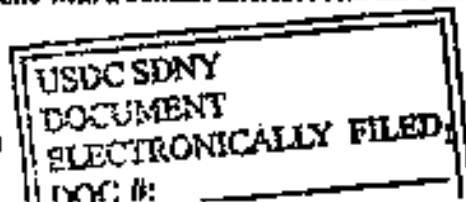
STIPULATION AND PROPOSED ORDER

In an effort to streamline the issues in the case, the parties to this action, Plaintiff Leighton Technologies, Inc. ("Leighton") and Defendants Oberthur Card Systems, S.A. and Oberthur Card Systems of America Corporation (collectively "Oberthur"), have met and conferred regarding (1) the current claims and defenses set forth in the pleadings; and (2) the products accused of infringement. The specific terms of the parties' agreement are set forth below.

In view of this Stipulation, and subject to approval by the Court, the parties have agreed to file amended pleadings which reflect the claims, counterclaims and defenses which are being dismissed or amended. The amended pleadings are attached to this Stipulation and Proposed Order.

Oberthur has represented that to date, it has made, used or sold less than 5,000 "dual mode cards" in the United States, and have not made or sold any "hybrid cards" other than the sale to Sun Microsystems Oberthur already identified to Leighton during discovery. Dual mode cards are cards that have a single chip and both contact and contactless interfaces. Hybrid cards are cards that have two chips, one with a contact interface and the other with a contactless interface.

11/29/2006 10:15 AM



Oberthur has also represented that it will promptly notify Leighton if at any time prior to the conclusion of trial it makes, uses or sells more than 20,000 dual mode cards or hybrid cards to or on behalf of any customer, including the U.S. government (Oberthur does not in any way concede, however, that U.S. government sales fall within the scope of this case). The notice requirement will be triggered by Oberthur initiating the manufacture of cards to fill an order for more than 20,000 cards. Leighton has reserved its right to assert the '367 and '099 patents in the event that occurs.

I. As a result of these representations, Leighton has decided to dismiss, without prejudice, all causes of action relating to two of the patents in suit, U.S. Patent Nos. 6,514,367 and 6,036,099 ("367 and '099 patents"), with each party to bear its own costs and fees relating to those causes of action, and to file a Third Amended Complaint. Oberthur does not oppose this dismissal.

II. With respect to certain affirmative defenses and counterclaims set forth in Oberthur's Answer to Leighton's Second Amended Complaint, Oberthur wishes to amend its pleadings as follows, and Leighton while reserving its rights to challenge the merits of the pleadings, does not oppose the amendment that:

- a) The Second and Third affirmative defenses of Oberthur are hereby dismissed without prejudice, with each party to bear its own costs and fees relating to those affirmative defenses;
- b) The Fifth, Sixth, Seventh, Eighth and Ninth counterclaims of Oberthur for Tortious Interference with Prospective Economic Advantage, Attempted Monopolization, and Restraint of Trade are hereby dismissed without prejudice, with each party to bear its own costs and fees relating to those counterclaims;

c) The First and Second counterclaims for inequitable conduct in the prosecution of the '367 patent and U.S. Patent No. 6,214,155 shall proceed against Leighton (and are not being asserted against former Counterclaim Defendant Keith Leighton in his individual capacity);

d) The Third counterclaim for a declaratory judgment of invalidity and noninfringement is hereby dismissed without prejudice as to Counterclaim Defendants Alexander Poltorak, Paul J. Lerner and Keith Leighton, with Oberthur and each of these Defendants to bear their own costs and fees relating to those counterclaims. The Third counterclaim shall proceed against the non-individual defendants, Defendant Leighton and Counterclaim Defendants General Patent Corporation International, General Patent Corporation, JP Holdings LLC (this stipulation will not be used as a basis for the former individual defendants, Poltorak, Lerner and Leighton, to object to providing discovery in this case);

e) The Fourth counterclaim for patent misuse shall proceed against the non-individual defendants, Defendant Leighton and Counterclaim Defendants General Patent Corporation International, General Patent Corporation, JP Holdings LLC;

III. During any trial of this action, the parties will not discuss, argue or otherwise refer to the causes of action, counterclaims and affirmative defenses dismissed by this stipulation (this does not preclude either party from referring to the dismissed patents during trial to the extent they relate to issues in the case); and


IV. The amended pleadings, including: the Third Amended Complaint; the Answer and Counterclaims to that Complaint; and the Answer to the Counterclaims are attached hereto

as exhibits, and will be filed in the same form upon approval of this Stipulation and Proposed Order by the Court.

STIPULATED AND AGREED TO BY:

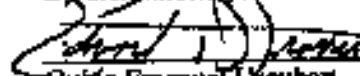
Dated: July 22, 2006 LEIGHTON TECHNOLOGIES LLC, GENERAL
PATENT CORPORATION INTERNATIONAL,
GENERAL PATENT CORPORATION, IP
HOLDINGS LLC, ALEXANDER I. POLTORAK,
PAUL J. LERNER AND KEITH LEIGHTON

By their attorneys:


Sutherland Asbill & Brennan, LLP
1275 Pennsylvania Avenue, N.W.
Washington, DC 20004-2415
Tel.: 202-383-0100
Fax: 202-637-3593
Robert A. Gutkin, Esq. (Pro hac vice)
Blair M. Jacobs, Esq. (Pro hac vice)
Christina A. Ondrick, Esq. (Pro hac vice)

Dated: July 24, 2006 OBERTHUR CARD SYSTEMS, S.A. and
OBERTHUR CARD SYSTEMS OF AMERICA
CORPORATION

By their attorneys:


Quinn Emanuel Frierhant
Oliver & Hedges LLP
51 Madison Avenue, 22nd Floor
New York, New York 10010
Tel.: 212-849-7000
Fax: 212-849-7100
Edward DeFranco (ED-6524)
Kevin Johnson (KJ-8689)
Robert Juman (RJ-6350)

PURSUANT TO STIPULATION, IT IS SO ORDERED.


Hon. Lisa Margaret Smith
United States Magistrate Judge

EXHIBIT 5

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

- - - - -
LEIGHTON TECHNOLOGIES, LLC,)
) plaintiff,)
) Case No.
) 04 Civ. 02496 (CM)
OBERTHUR CARD SYSTEMS, S.A.)
and OBERTHUR CARD SYSTEMS)
OF AMERICA CORP.,)
) defendants.)

- - - - -
(Volume III - pages 522 through 875)
- - - - -

Continued videotaped deposition of
KEITH LEIGHTON, a witness herein, called by the
defendants as if upon cross-examination, and
taken before David J. Collier, RPR, Notary
Public within and for the State of Ohio,
pursuant to Notice of Deposition and pursuant to
the further stipulations of counsel herein
contained, on Monday, the 23rd day of October,
2006 at 8:02 a.m., at the offices of Tackla &
Associates, 1620 Ohio Savings Plaza, City of
Cleveland, County of Cuyahoga and the State of
Ohio.

1 gel or some other protective coating, do you
2 call it something else?

3 A I don't know what they would call it.

4 Q Okay.

5 A Every manufacturer has their own process --

6 Q Okay.

7 A -- of making cards.

8 Q So for the Motorola process, you'd call
9 it -- you'd call it the inlay that was enclosed
10 in a gel?

11 A That's what they were using at the time I
12 went out there.

13 Q Okay. At the time that you -- is that the
14 first time, when you saw that Motorola card,
15 that you ever saw an electronic element
16 incorporated in a laminated card?

17 MR. GUTKIN: Object to form.

18 A I can't recall if that's the first time. I
19 might have seen a contact chip, which would be
20 the same type.

21 Q Okay. I think at one of your earlier
22 depositions you said you hadn't seen an
23 electronic element laminated in a card before
24 you started working at Motorola.

25 A That would be correct. You asked me if I

1 had seen an electronic element before --

2 Q Okay.

3 A -- not laminated in a card.

4 Q Not laminated. Okay.

5 Other than an electronic element, had
6 you worked with anything that had been laminated
7 in a card prior to your work for Motorola?

8 A Other than an electronic element?

9 Q Yes.

10 A I put a metallic foil --

11 Q Okay.

12 A -- in a card.

13 Q That was a layer of metallic foil?

14 A Yes. It was a gold called -- Crown Leaf
15 was the manufacturer, they made material for
16 holograms --

17 Q Okay.

18 A -- they make --

19 Q And what was the purpose of that gold foil
20 layer?

21 A That was given to me while I worked out at
22 Cardtech --

23 Q Okay.

24 A -- now called G & D or Giesecke & Devrient.

25 Q And what was the purpose of that?

EXHIBIT 6

CONFIDENTIALITY AGREEMENT

In consideration of my engagement by Motorola, Inc. ("Motorola"), as a Consultant/Contractor for programs or products as directed by Motorola, and in consideration of the compensation paid to me for my services in the course of such engagement, I understand and agree to the following provisions for the protection of the property rights of Motorola:

1. I will promptly and fully communicate in writing to an Executive Officer of Motorola or its business, all inventions, innovations and ideas developed or conceived by me, whether solely or jointly with others at any time during the entire period of my engagement with Motorola, and which inventions, innovations and ideas relate to the actual and anticipated business activities of Motorola, or result from, or are suggested by, work which I do for Motorola. I agree to assign and hereby assign to Motorola as its exclusive property the entire right, title and interest in all such inventions, innovations and ideas. I will, at all times during my engagement with Motorola, and after the termination of my engagement for any reason, assist Motorola in every proper way but entirely at Motorola's expense, to obtain and maintain for Motorola's benefit patents, copyrights, and other legal protection in any and all countries for the above-mentioned invention, innovations, and ideas. When requested, I will execute all papers, provide proper assistance and do all things that may reasonably be required in order to protect and maintain the rights of Motorola in such inventions, innovations, and ideas. I agree that all such inventions, innovations, and ideas are and will remain the property of Motorola whether or not patented. I agree to keep, maintain and make available to Motorola, written records of all such inventions, innovations, and ideas, and to submit promptly such written records, and supplemental oral disclosures, to designated representatives of Motorola. I agree that the obligations of this paragraph 1 will be binding upon my heirs, executors and administrators, and may be transferred by Motorola.
2. That I will maintain strictly confidential and not publish, disseminate, or disclose to others, data and information of Motorola which I may originate or of which I learn during my period of engagement with Motorola and which is of a confidential or secret nature, including but not limited to product, machine, and process developments, whether patentable or not, manufacturing "know-how", formulas, designs, photographs, plans, specifications, drawings, sketches,

schematics, parts lists, computer software, cost and pricing practices, customer lists, records of customer requirements and usage, personnel records, company financial records, and the like. I will only use such data and information as required in and for the performance of work for Motorola. I acknowledge that my obligations not to use, publish or otherwise disclose such data and information of Motorola to others continues after termination of my engagement with Motorola. Upon termination of my period of engagement with Motorola for any reason whatsoever, I will not take with me or remove documentary material of Motorola on such data and information, or any record or copy thereof in whole or part.

3. The obligations in paragraph 1 do not apply to any such data or information which is, or becomes, publicly available otherwise than through breach of this Agreement. I agree that during my period of engagement with Motorola I may originate or learn of such data and information through visual, oral, or documentary means. I agree that the obligations in these paragraphs 2 and 3 are fair and reasonable, and are essential for the protection of the property rights of Motorola. With respect to any such data and information which is in a physical or documentary form, I agree that the obligations in these paragraphs 2 and 3 are binding upon my heirs, executors, and administrators, and may be transferred by Motorola. This Agreement replaces any existing agreement between Motorola and me regarding patents and/or confidential information and may not be modified except in writing with approval of an Executive Officer of Motorola or its nominee.

Keith R. Leighton
CONSULTANT SIGNATURE
Keith R. Leighton
PRINTED NAME
2-23-95
DATE

MOTOROLA WITNESS SIGNATURE

PRINTED NAME

DATE

EXHIBIT 7

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

LEIGHTON TECHNOLOGIES, LLC,)
) plaintiff,)
) vs.)
) Case No.)
) Da Civ. 02496 (CM))

OBERTHUR CARD SYSTEMS, S.A.)
and OBERTHUR CARD SYSTEMS)
OF AMERICA CORP.,)
) defendants.)

(Volume III - pages 523 through 875)

Continued videotaped deposition of
KEITH LEIGHTON, a witness herein, called by the
defendants as if upon cross-examination, and
taken before David J. Collier, RPR, Notary
Public within and for the State of Ohio,
pursuant to Notice of Deposition and pursuant to
the further stipulations of counsel herein
contained, on Monday, the 23rd day of October,
2006 at 8:02 a.m., at the offices of Tackla &
Associates, 1020 Ohio Savings Plaza, City of
Cleveland, County of Cuyahoga and the State of
Ohio.

1 work.

2 Q Okay. Do you remember discussing the
3 confidentiality agreement at any point after you
4 signed it with any Motorola employees?

5 A No.

6 Q Did you ask any questions about the
7 backdating issue? I understand --

8 A No.

9 Q -- that they told you why they were
10 embarrassed about it, right?

11 A Um-hum.

12 Q Did you ask them any questions about it?

13 A No.

14 Q Did you -- did you backdate it to the date
15 that they asked you to backdate it to?

16 A I believe I did.

17 Q And prior to seeing that confidentiality
18 agreement, had you had any discussions with any
19 Motorola employees at all about obligations to
20 assigned inventions to Motorola?

21 A No.

22 Q The first time you heard about it was when
23 you saw the confidentiality agreement?

24 A That's correct.

25 Q And prior to the time that you signed the

1 confidentiality agreement, did you believe you
2 were under any obligation as a consultant to
3 Motorola with respect to any inventions you
4 might come up with?

5 A I understood by reading the contract, while
6 being employed at Motorola if I come up with any
7 inventions, that those would be the property of
8 Motorola.

9 Q Okay. And you accepted that obligation?

10 A Yes.

11 Q And did you accept that obligation
12 extending back to the time that you signed the
13 confidentiality agreement?

14 A Repeat that?

15 Q In other words, you signed the
16 confidentiality agreement on a given day.

17 A Right.

18 Q You put a date that was earlier in time.

19 A Right.

20 Q Did you have any problem with agreeing to
21 that obligation beginning earlier in time when
22 you first --

23 A No, I didn't.

24 Q -- began working?

25 A I didn't have a problem with that.

EXHIBIT 8

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

LEIGHTON TECHNOLOGIES, LLC, }
 } plaintiff, }
 } }
 } Case No. }
 } }
 } 04 Civ. 02496 (CM)
 } }
OBERTHUR CARD SYSTEMS, S.A. }
and OBERTHUR CARD SYSTEMS }
OF AMERICA CORP., }
 } defendants. }

(Volume III - pages 522 through 875)

Continued videotaped deposition of
KEITH LEIGHTON, a witness herein, called by the
defendants as if upon cross-examination, and
taken before David J. Collier, EPR, Notary
Public within and for the State of Ohio,
pursuant to Notice of Deposition and pursuant to
the further stipulations of counsel herein
contained, on Monday, the 23rd day of October,
2006 at 8:02 a.m., at the offices of Tackla &
Associates, 1020 Ohio Savings Plaza, City of
Cleveland, County of Cuyahoga and the State of
Ohio.

1 A That's correct.

2 Q Was the antenna and coil enclosed in a gel?

3 A No.

4 Q All right. What was the antenna and coil
5 placed on?

6 A We affixed it to the bottom sheet with a
7 glue stick.

8 Q To the bottom core sheet --

9 A That's correct.

10 Q -- that you labeled?

11 So were there any other changes made
12 to the structure of the card that you made for
13 Motorola?

14 A Actually, after making a pre-lam with no
15 cutouts we then laminated that first with two
16 sheets, being a pre-lam, cooled down, squared
17 the sheet up again, put their printed sheet on
18 top of it and over-laminate film and went back
19 into the laminator.

20 Q Okay. All right. Let me -- let me break
21 it down, make sure I understand, okay?

22 You've drawn in Exhibit A, the bottom
23 half, the layers of the card that Motorola had
24 when you first arrived. Do you see that?

25 A Right.

1 Q And you made some changes to those layers
2 in the card that you redesigned for them; is
3 that true?

4 A Right.

5 Q And one of the changes that you made was
6 you eliminated the holes or the recesses or the
7 cutouts that were in the core sheet with the
8 inlay; is that right?

9 A That's correct.

10 Q And you placed the electronic element
11 directly on the core sheet?

12 A That's correct.

13 Q Is that right? You got rid of the gel.

14 A Got rid of the gel, got rid of the holes.

15 Q Okay. Did you change the layers of the
16 card in any other way other than what you just
17 described?

18 A I made a two-piece pre-lam first and
19 laminated it.

20 Q Okay. And the two-piece pre-lam included
21 the core sheet with the electronic element glued
22 on top?

23 A That's correct.

24 Q And another core sheet on top of that?

25 A That's correct. Two core sheets.

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

- - - - -
LEIGHTON TECHNOLOGIES, LLC,)
) plaintiff,)
)
vs.) Case No.
) 04 Civ. 02496 (CM)
)
OBERTHUR CARD SYSTEMS, S.A.)
and OBERTHUR CARD SYSTEMS)
OF AMERICA CORP.,)
) defendants.)

- - - - -
(Volume III - pages 522 through 875)
- - - - -

Continued videotaped deposition of
KEITH LEIGHTON, a witness herein, called by the
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Public within and for the State of Ohio,
pursuant to Notice of Deposition and pursuant to
the further stipulations of counsel herein
contained, on Monday, the 23rd day of October,
2006 at 8:02 a.m., at the offices of Tackla &
Associates, 1020 Ohio Savings Plaza, City of
Cleveland, County of Cuyahoga and the State of
Ohio.

Tackla & Associates

dad8f79e-def-4706-a601-e06301d19420

1 A Right.

2 Q And was pressure applied immediately?

3 A To close the laminator you're applying
4 pressure.

5 Q Okay. And would the inlays with the
6 electronic elements experience any pressure
7 prior to when the platens were closed and the
8 process began?

9 A The inlays received the full blunt of
10 pressure immediately prior to heating.

11 Q So this is when -- this point is when the
12 press closes, right?

13 A Correct.

14 Q And at this point the inlays receive full
15 pressure?

16 A Full pressure.

17 Q Okay. And did the pressure change during
18 the heating phase at all?

19 A The pressure comes off the inlays as the
20 plastic softens.

21 Q Okay. And when did that occur? Again,
22 we're talking about the process you did at
23 Motorola.

24 A It occurs between the time of the start of
25 the heat cycle soak through the end of the heat

1 cycle soak. That is when the plastic becomes
2 soft, and then you increase the pressure for the
3 remainder of the heat cycle.

4 Q Okay. About -- about what point during the
5 heat cycle did you increase the pressure when
6 you were doing this work at Motorola? The heat
7 cycle was about 35 minutes.

8 A Right.

9 Q And --

10 A We went there on the heat soak time
11 approximately 15 -- 10 to 15 minutes.

12 Q Okay. So this --

13 A I have that illustrated there.

14 Q Yeah. This is -- so I'll just say about 15
15 minutes, right?

16 A Right.

17 Q Is that when the pressure was increased?

18 A After the heat cycle is complete we
19 increase the pressure.

20 Q Okay. This is the time of pressure
21 increase?

22 A Right.

23 Q Why don't we mark this as Exhibit E.

24
25 (Defendant's Exhibit E

1 marked for identification.)

2 - - - - -

3 Q So we marked on Exhibit E the time of the
4 pressure increase; is that right?

5 A Correct.

6 Q That's the point where the plastic is soft
7 enough?

8 A Right.

9 Q So that the --

10 A You can increase and facilitate
11 encapsulating the electronics in the plastic.

12 Q Okay. And when you did that -- when you
13 did that in this process at Motorola, was that
14 new to Motorola? Had they increased the
15 pressure after the heat sync time or is that a
16 step that you added?

17 A I don't know what Motorola did prior to my
18 coming.

19 Q Okay. You don't know whether they did that
20 or not?

21 A No.

22 Q That's something you did; if they did it,
23 they didn't tell you?

24 A That's correct.

25 Q All right. And --

EXHIBIT 10

*****CONFIDENTIAL DEPOSITION*****

IN THE UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

Leighton Technologies, LLC,)

Plaintiff-Counterclaim)

Defendant,) Case No.

-vs-) 04Civ

Oberthur Card Systems, S.A.,) 2496 (CM)

Defendant-Counterclaim)

Plaintiff.)

- - - o0o - - -

Continued deposition of KEITH R.

LEIGHTON, a witness herein, called by the

Defendant- Counterclaim Plaintiff, as if

upon cross-examination under the statute,

and taken before Luanne Stone, a Notary

Public within and for the State of Ohio,

pursuant to the issuance of notice and

subpoena, and pursuant to the further

stipulations of counsel herein contained, on

Monday, the 10th day of October, 2005 at

9:00 o'clock A.M., at the Renaissance Hotel,

the City of Cleveland, the County of

Cuyahoga and the State of Ohio.

*****CONFIDENTIAL DEPOSITION*****

1 A: I kept trying until I found a
2 temperature and pressure that would produce
3 a smooth prelam to begin with, which took
4 many tests.

5 Q: Did you use a different pressure
6 during the cooling than you did during the
7 heating?

8 A: Yes.

9 Q: Did you use a higher pressure during
10 the cooling than you used in the heating?

11 A: I don't recall all of that, because
12 they had an antique circuit board, single
13 function pump, and they changed the plumbing
14 on their rams, so what the actual pressures
15 were, I'm not sure.

16 Q: Well, based on your experience and
17 your knowledge, was the pressure higher in
18 the cooling than the pressure in the
19 heating?

20 A: I tried to obtain that, yes.

21 Q: So, you tried -- your goal was to
22 obtain a higher pressure during the cooling
23 than in the heating?

24 A: Right, from my previous knowledge
25 that I use on all the card manufacturing.

TACKLA & ASSOCIATES

EXHIBIT 11

Keith Leighton
2817 Fulmer Rd
Lorain, Ohio 44053

July 18, 1995

Rughee Identification Devices
14311 Chambers
Tustin, Ca 92680

Attention: Mr. Donald G. Small

Dear Mr. Small:

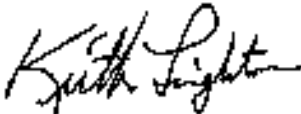
I talked to you last week on the phone about RF-ID cards that
has a surface flatness of .00005" and have enclosed samples
for you to examine.

I will be able to produce these cards with a thickness of .032"
on PVD. You stated that you were very interested in these cards
and would get back with me.

After examining the cards, please return them to me by certified
mail.

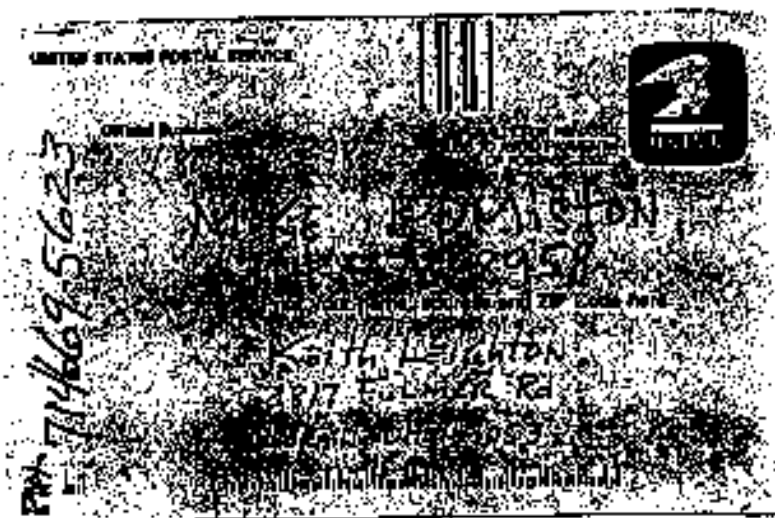
If you have any question, please call me.

Sincerely,



Keith Leighton

(216) 960-1697



Trial Counsel's Eyes Only

L04784

SENDER Complete Name 1 address of the individual service. Company Name 2, and the R.F.D. Your work name and address the 3rd address of the service. Telephone Number 4 (Area Code) (City) (State) (Zip) Address 5th line to 10th line (City) (State) (Zip) State and Zip Code Write "The U.S. Postal Service" on the envelope cover. The actual delivery. The Return Receipt will not be sent to you unless you pay for it.		I also wish to receive the following services for my delivery: Insure <input type="checkbox"/> Registered Delivery <input type="checkbox"/> Signature Required for Delivery <input type="checkbox"/>	
ADDRESSEE Complete Name 1 address of the individual service. Company Name 2, and the R.F.D. Your work name and address the 3rd address of the service. Telephone Number 4 (Area Code) (City) (State) (Zip) Address 5th line to 10th line (City) (State) (Zip) State and Zip Code Write "The U.S. Postal Service" on the envelope cover. The actual delivery. The Return Receipt will not be sent to you unless you pay for it.		I also wish to receive the following services for my delivery: Insure <input type="checkbox"/> Registered Delivery <input type="checkbox"/> Signature Required for Delivery <input type="checkbox"/>	

Trial Counsel's Eyes Only

L04785

EXHIBIT 12

Motorola, Inc. Ken Thompson

408 383 7941

07/12/95

6:27 PM

024

July 12, 1995

Ken Thompson
Technical Operations Manager
Motorola India Corp.
3041 Orchard Parkway
San Jose, Ca. 95118
ph 408 383 4092
fax 7941

Keith Leighton
2817 Fokner Rd.
Locain, OH. 44053
ph 216 960 1697
wk 631 7710
fax 960 2335

Keith,

We have reviewed your request for the \$1500 bonus for ISO card production. Jean-Marc and I agree that regardless of the tooling situation to produce 10,000 cards, the process which you developed over the course of 5 weeks is not deemed an acceptable "production process" due to the <24% yield. I think you would agree that a company cannot successfully compete in today's marketplace with a manufacturing yield of <95% for this type of product.

Please review the below "deliverables list" that you signed prior to us issuing a P.O. for your services. The status on all items is highlighted in times print. As you can see, most of the items were not completed, but our position is that not items needed to be completed to successfully receive the \$1500 bonus.

Keith, if you feel that you have additional information that you may want to share with us on the \$1500 bonus issue, please let me know. At this time, we are not in the position to entertain a potential action to our card lamination thru contracted process development unless we are convinced it has a high probability of success. I look forward to hearing from you.

Regards,

Ken Thompson

cc: Jean-Marc Dubois
Jaime Martorell
Brad Kolb
Neal Eberhardt

-- Motorola India Confidential and Proprietary --

EXHIBIT 13

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

- - - - -

LEIGHTON TECHNOLOGIES, LLC, }
 } plaintiff, }
 } Case No. }
vs. } 04 Civ. 02496 (CM)
 }
OBERTHUR CARD SYSTEMS, S.A. }
and OBERTHUR CARD SYSTEMS }
OF AMERICA CORP., }
 } defendants. }

- - - - -

(Volume III - pages 523 through 875)

- - - - -

Continued videotaped deposition of
KEITH LEIGHTON, a witness herein, called by the
defendants as if upon cross-examination, and
taken before David J. Collier, EPR, Notary
Public within and for the State of Ohio,
pursuant to Notice of Deposition and pursuant to
the further stipulations of counsel herein
contained, on Monday, the 23rd day of October,
2006 at 8:02 a.m., at the offices of Tackla &
Associates, 1020 Ohio Savings Plaza, City of
Cleveland, County of Cuyahoga and the State of
Ohio.

Tackla & Associates

dc05778-dact-4798-e587-ebd3c1d10420

1 patent-related application work?

2 A On this first one, yes.

3 Q All right. On the first provisional that
4 was filed?

5 A Yes.

6 Q At some point did somebody else begin to
7 pay the attorney's fees?

8 A Not at that time.

9 Q At some point did somebody -- somebody did?

10 A I had to borrow money in order to complete
11 it.

12 Q Okay. How much did you personally pay to
13 have the patents filed, for the patent work?

14 A I don't recall that.

15 Q Do you remember if it was 1,000 or 10,000?

16 A I don't recall that.

17 Q You have no idea --

18 A No.

19 Q -- how much it was?

20 A No.

21 Q Not significant enough to stick in your
22 mind in any way?

23 MR. GUTKIN: Object to form.

24 A No.

25 Q Okay. And at some point someone else came

1 in and started to pay for the patent application
2 work?

3 A I had my son help me.

4 Q Okay.

5 A It was within the family.

6 Q Okay. And did anybody outside the family
7 ever pay for any of your patent applications for
8 patents?

9 A I don't know if it was to deal with this
10 one --

11 Q Okay.

12 A -- but I did borrow money and give up a
13 portion of my patent rights.

14 Q Okay. And who did you give up a portion of
15 your patent rights to?

16 A I had three investors that come in --

17 Q Okay.

18 A -- not just for this patent but for the
19 other ones also.

20 Q All in the same area, right?

21 A Right.

22 Q There's a group of patents here.

23 A Right.

24 Q These are all RFID process patents, right?

25 A Correct.

1 Q And who were the investors?

2 A There was three investors. One of them --
3 or two of them worked with my son at Ford Motor.

4 Q Okay.

5 A And one was a friend that owns a shoe
6 store.

7 Q Okay. And they still have interest in the
8 patents?

9 A Each. Yes, they do.

10 Q And at any point did anyone else take an
11 interest in the patents?

12 A These investors were assigned and it was
13 recorded at the Patent Office.

14 Q Okay. They were assigned a percentage of
15 the --

16 A Right.

17 Q -- patents. Okay.

18 And did anyone else, anybody else in
19 the world ever contribute to the funds that went
20 into the patent application process and your
21 patents?

22 A No.

23 Q At some point did somebody else take an
24 interest, a financial interest in your patents?

25 A That's when we joined with General Patent

EXHIBIT 14

**EXHIBIT 14 IS BEING FILED UNDER SEAL
PURSUANT TO THE PROTECTIVE ORDER
ENTERED IN THIS CASE ON AUGUST 20, 2004
BECAUSE IT CONTAINS CONFIDENTIAL INFORMATION**

EXHIBIT 15

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Westlaw

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H**Briefs and Other Related Documents**

Leighton Technologies LLC v. Oberthur Card Systems, S.A.S.D.N.Y., 2005.

United States District Court, S.D. New York.

LEIGHTON TECHNOLOGIES LLC, Plaintiff-Counterclaim Defendant,

v.

OBERTHUR CARD SYSTEMS, S.A., Defendant-Counterclaim Plaintiff.

No. 04 CIV. 2496(CM).

March 9, 2005.

Background: Suit was brought alleging infringement of patents describing a hot lamination process for manufacturing a "contactless smart card" with an embedded electronic element and an aesthetically pleasing, smooth finished surface that was capable of receiving dye sublimation printing. Defendant denied infringement and contested the validity of the patents.

Holdings: In construing disputed claim terms, the District Court, McMahon, J., held that:

(1) phrase "electronic element," was not susceptible to narrow construction which limited the term to a combination of a microchip and an antenna, and

(2) terms "first," "second" and "third," as used in patent claims referred to the sequential order in which the steps were to be performed.

Claims construed.

West Headnotes

111 Patents 291 C-314(5)**291 Patents****291X(1) Infringement****291X10(C) Suits in Equity****291k314 Hearing****291k314(5) k. Questions of Law or Fact.****Most Cited Cases**

Patent claim construction presents a question of law for a judge, not one of fact for a jury.

121 Patents 291 C-101(11)**291 Patents****2911V Applications and Proceedings Thereon****291k101 Claims****291k101(11) k. Process or Method Claims.****Most Cited Cases**

For process or method claims, patent claim interpretation may involve ascertaining whether the claim may be interpreted to require that the steps be performed in a specific order; test for determining whether the steps included in a process claim must be performed in the recited order requires court to look to the claim language to determine if, as a matter of logic or grammar, they must be performed in the order written, and, if not, court next looks to the rest of the specification to determine whether it directly or implicitly requires such a narrow construction.

121 Patents 291 C-165(5)**291 Patents****2911X Construction and Operation of Letters Patent****2911X(8) Limitation of Claims****291k165 Operation and Effect of Claims in General****291k165(5) k. Construction of Particular Claims as Affected by Other Claims. Most Cited Cases**

Ordinarily, terms are to be construed so that they have the same meaning throughout a patent.

141 Patents 291 C-157(2)**291 Patents****2911X Construction and Operation of Letters Patent****2911X(A) In General****291k152 General Rules of Construction****291k152(2) k. Construction to Give Validity and Effect to Patent. Most Cited Cases**

Courts are to construe claims so as to sustain a patent's validity where possible.

151 Patents 291 C-101(3)

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291 Patents

291IV Applications and Proceedings Thereon

291k101 Claims

291k101(3) k. Limitations in General. Most Cited Cases

Phrase "electronic element," as used in patents describing a hot lamination process for manufacturing a "contactless smart card" with an embedded electronic element, could not be construed with reference solely to intrinsic evidence without defining additional terms "semiconductor," "conductor," "insulator," and "electrical;" phrase "electronic element" was not susceptible to narrow construction which limited the term to a combination of a microchip and an antenna.

161 Patents 291 ⇌ 165(4)

291 Patents

291IX Construction and Operation of Letters Patent

291IX(B) Limitation of Claims

291k165 Operation and Effect of Claims in General

291k165(4) k. Reading Limitations or Elements Into Claims, or Disregarding Limitations or Elements. Most Cited Cases
 A patent is not limited to its disclosed embodiments.

171 Patents 291 ⇌ 101(2)

291 Patents

291IV Applications and Proceedings Thereon

291k101 Claims

291k101(2) k. Construction in General. Most Cited Cases

Phrase "non-electronic carrier," as used in patents describing a hot lamination process for manufacturing a "contactless smart card" with an embedded electronic element, meant a holder used for electronic devices to protect them from physical damage, which device was not part of a circuit that utilized a semiconductor device.

181 Patents 291 ⇌ 101(2)

291 Patents

291IV Applications and Proceedings Thereon

291k101 Claims

291k101(2) k. Construction in General.

Most Cited Cases

Term "directly," as used in patents describing a hot lamination process for manufacturing a "contactless smart card" with an embedded electronic element, meant "in immediate physical contact" in context of claim language "positioning said at least one electronic element in the absence of a non-electronic carrier directly between said first and second plastic core sheets."

191 Patents 291 ⇌ 101(2)

291 Patents

291IV Applications and Proceedings Thereon

291k101 Claims

291k101(2) k. Construction in General. Most Cited Cases

Phrase "encapsulated by," as used in patents describing a hot lamination process for manufacturing a "contactless smart card" with an embedded electronic element, meant "enclosed by," and phrase "encapsulating" meant "enclosing."

1101 Patents 291 ⇌ 101(2)

291 Patents

291IV Applications and Proceedings Thereon

291k101 Claims

291k101(2) k. Construction in General. Most Cited Cases

In the context of language "coating at least one of said outer surfaces of said core with a layer of ink," as used in patents describing a hot lamination process for manufacturing a "contactless smart card" with an embedded electronic element, term "coating" meant "covering."

1111 Patents 291 ⇌ 101(2)

291 Patents

291IV Applications and Proceedings Thereon

291k101 Claims

291k101(2) k. Construction in General. Most Cited Cases

In the context of language "minimal first run pressure," as used in patents describing a hot lamination process for manufacturing a "contactless smart card" with an embedded electronic element, word "minimal" meant the smallest or least amount of run

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Page 3

pressure necessary to accomplish the designated step.

1121 Patents 291 C=101(2)

291 Patents

291IV Applications and Proceedings Thereon

291k101 Claims

291k101(2) k. Construction in General.

Most Cited Cases

Terms "first," "second" and "third," as used in patent claims referred to the sequential order in which the steps were to be performed in a hot lamination process for manufacturing a "contactless smart card" with an embedded electronic element.

1131 Patents 291 C=165(3)

291 Patents

291IX Construction and Operation of Letters Patent

291IX(B) Limitation of Claims

291k165 Operation and Effect of Claims in General

291k165(3) k. Construction of Language of Claims in General. Most Cited Cases

Patents 291 C=167(1)

291 Patents

291IX Construction and Operation of Letters Patent

291IX(B) Limitation of Claims

291k167 Specifications, Drawings, and Models

291k167(1) k. In General. Most Cited Cases

Patents 291 C=168(2.1)

291 Patents

291IX Construction and Operation of Letters Patent

291IX(B) Limitation of Claims

291k168 Proceedings in Patent Office in General

291k168(2) Rejection and Amendment of Claims

291k168(2.1) k. In General. Most Cited Cases

Where the language of the claim, the specification, and the prosecution history logically indicate a sequential process, recited steps in a claim must be read to require a sequential order.

1141 Patents 291 C=181(6)

291 Patents

291IV Applications and Proceedings Thereon

291k101 Claims

291k101(6) k. Ambiguity, Uncertainty or Indefiniteness. Most Cited Cases

Courts interpreting patents routinely avoid indefiniteness by interpreting language to provide for an antecedent basis.

1151 Patents 291 C=181(2)

291 Patents

291IV Applications and Proceedings Thereon

291k101 Claims

291k101(2) k. Construction in General. Most Cited Cases

Phrase "controlled flow," as used in patents describing a hot lamination process for manufacturing a "contactless smart card" with an embedded electronic element, meant regulated and directed forward continuous movement.

1161 Patents 291 C=101(2)

291 Patents

291IV Applications and Proceedings Thereon

291k101 Claims

291k101(2) k. Construction in General. Most Cited Cases

Phrase "cooling said core while applying a second pressure," as used in patents describing a hot lamination process for manufacturing a "contactless smart card" with an embedded electronic element, meant cooling said core during the time that a second pressure is applied.

1171 Patents 291 C=101(2)

291 Patents

291IV Applications and Proceedings Thereon

291k101 Claims

291k101(2) k. Construction in General.

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Most Cited Cases

Phrase "cooling said core in conjunction with the concurrent application of a third pressure," as used in patents describing a hot lamination process for manufacturing a "contactless smart card" with an embedded electronic element, meant "cooling said core while at the same time applying a third pressure."

[15] Patents 291 \Leftrightarrow 101(2)

291 Patents

291IV Applications and Proceedings Thereon

291k101 Claims

291k101(2) k. Construction in General.

Most Cited Cases

Phrase "plastic core sheets," as used in patents describing a hot lamination process for manufacturing a "contactless smart card" with an embedded electronic element, meant sheets of plastic between which the electronic element is positioned.

[19] Patents 291 \Leftrightarrow 101(2)

291 Patents

291IV Applications and Proceedings Thereon

291k101 Claims

291k101(2) k. Construction in General.

Most Cited Cases

Phrase "laminator apparatus," as used in patents describing a hot lamination process for manufacturing a "contactless smart card" with an embedded electronic element, meant equipment that is used to unite two or more layers of material, such as the core, by the application of heat and pressure.

[20] Patents 291 \Leftrightarrow 101(2)

291 Patents

291IV Applications and Proceedings Thereon

291k101 Claims

291k101(2) k. Construction in General.

Most Cited Cases

Term "milling," as used in patents describing a hot lamination process for manufacturing a "contactless smart card" with an embedded electronic element, meant taking a machine to remove.

Patents 291 \Leftrightarrow 328(2)

291 Patents

291XIII Decisions on the Validity, Construction, and Infringement of Particular Patents

291k328 Patents Enumerated

291k328(2) k. Original Utility. Most Cited

Cases

4,490,024, 5,519,201. Cited as Prior Art.

Patents 291 \Leftrightarrow 328(2)

291 Patents

291XIII Decisions on the Validity, Construction, and Infringement of Particular Patents

291k328 Patents Enumerated

291k328(2) k. Original Utility. Most Cited

Cases

5,817,202, 6,036,099, 6,214,155, 6,514,367. Constructed.

*360 Blair M. Jacobs, Robert A. Gurkin, Sutherland, Asbill & Brennan, L.L.P., Washington, DC, Joseph Floriani, Patrick L. Parker, Valeria Calaffore, Patrick Lee Parker, Clifford Chance US LLP, New York, NY, for Plaintiff.

Frank Michael Gossard, Baker & McKenzie (NY), New York, NY, for Defendant/Claimant.

James David Jacobs, Baker and McKenzie, New York, NY, for Claimant.

*364 DECISION CONSTRUING DISPUTED

CLAIM TERMS(Markman Decision)

MCMAHON, District Judge.

This is a patent infringement case.

Plaintiff, Leighton Technologies LLC ("Leighton"), owns U.S. Patent Nos. 5,817,202, 6,036,099, 6,214,155 and 6,514,367 (collectively, the "Patents" or "patents in suit"). All four Patents relate to radio frequency identification ("RFID") technology, which is the basis for the so-called "smart card," a plastic card that includes an electronic element (such as a computer chip) and a reader, and that is used in numerous common applications including security swipe cards, credit/debit cards, mass transit access, toll collection (EZ-Pass), and government identification. (Plaintiff's Brief in Support of Its Claim Construction, dated Nov. 5, 2004 ("Pl. Br.") at pp. 1, 3-4.)

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Smart cards come in three forms. As the name suggests, a "contactless" smart card transmits a signal when it is placed near the reading device, even if the card is contained in a purse or wallet. A "contact" smart card requires contact between a magnetic strip on the card and the reading device. A "dual function" card works with or without contact. (See Defendant Oberthur Card Systems, S.A. *Adversary Brief*, dated Nov. 3, 2004 ("Def. Br.") at p. 3.) Contactless and dual function smart cards all contain a computer chip and antennas, one or both of which are encapsulated between plastic sheets. (See, e.g., '207 patent; '099 patent.) In addition to an embedded electronic element, dual function cards also have an exposed electronic surface to facilitate contact transmission. (See, e.g., '099 patent; '367 patent.)

The Patents describe processes for making smart cards. Specifically, they claim the use of a "highly coordinated" lamination process involving heat, cooling and the application of pressure to encapsulate an electronic component that is essential to signal transmission between two plastic sheets to form contactless and dual function smart cards. (Pl. Br. at 1, 4.) The Patents allegedly improve over prior art by eliminating the need to create a protective barrier around the embedded electronic element, thereby uncomplicating the manufacturing process. Plaintiff's process also produces a card with a surface smooth enough to receive dye sublimation printing. (See, e.g., '207 patent; Abstract; Def. Br. at 5-6 (citing the 60,005,683 provisional application that matured into the '207 patent); Pl. Br. at 1, 9.)

Defendant Oberthur Card Systems, S.A. ("Oberthur") also manufactures smart cards. Plaintiff alleges that Defendant and its subsidiaries knew about and infringed the Patents in Oberthur's manufacturing processes. (Pl. Br. at 1.) Defendant denies infringement and contests the validity of Plaintiff's Patents, noting that "chip" cards, including contactless and dual function smart cards, have been manufactured using lamination techniques for years prior to the Patents, and that lamination has long been a well-known procedure for bonding card layers using heat and pressure. (Def. Br. at 4.)

[1] Before reaching the issues of validity and in-

fringement, this Court must construe the claims. This function has resided with the Court since the Federal Circuit decided, in *Affirmance v. Westview Instruments, Inc.*, 52 F.3d 967, 978-79 (Fed.Cir.1995), *aff'd* 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996), that claim construction presented a question of law for a judge, not one of fact for a jury.

Laighton has identified 36 claims in the Patents requiring construction: claims 1, 6, 7, 8, 11, 14-16 of the '207 patent; claims 1, 6, 7, 8, 12-15 of the '155 patent; claims 1, 6, 7, 9, 12, 14-16 of the '099 patent; and claims 1, 6, 9, 12, 15-17, 19-23 of the '367 '365 patent. (Pl. Br. at 13.) The parties agree on the meaning of most of the terms used in the Patents. The fourteen disputed terms in these claims requiring construction are: (1) "electronic element" (Def. Br. at 2; Pl. Br. at 13); (2) "non-electronic carrier" (Def. Br. at 2; Pl. Br. at 13); (3) "directly" (Def. Br. at 2; Pl. Br. at 13); (4) "comprising the steps of" (Def. Br. at 2); (5) "encapsulated by/encapsulating" (Def. Br. at 2); (6) "cooling at least one of said outer surfaces of said core with a layer of ink" (Def. Br. at 2; Pl. Br. at 13); (7) "minimal first ram pressure" (Def. Br. at 2); (8) "first pressure, second pressure, third pressure" (Def. Br. at 2); (9) "controlled flow" (Def. Br. at 2); (10) "cooling said core while applying a second pressure" (Def. Br. at 2); (11) "cooling said core in conjunction with the concurrent application of a third pressure" (Def. Br. at 2); (12) "plastic core sheets" (Pl. Br. at 13); (13) "lamination apparatus" (Pl. Br. at 13); and (14) "rolling" (Pl. Br. at 13).

Principles of Claim Construction

Certain principles deeply embedded in patent law guide the court in claim construction.

The meaning of a claim should be interpreted, if at all possible, in light of the intrinsic evidence: the claim language itself, the specification contained in the patent and the patent's prosecution history. *Affirmance*, 52 F.3d at 979. The intrinsic evidence constituted the public record of the patent on which the public is entitled to rely. *Id.* If the intrinsic evidence is sufficient to resolve the meaning of a disputed term, it is improper to resort to extrinsic evidence, such as expert testimony or treatises, in constructing claim lan-

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gauge. *Pitronics Corp. v. Concoventrite, Inc.*, 90 F.3d 1576, 1583 (Fed.Cir.1996). Only if intrinsic evidence is insufficient to resolve an ambiguity in a disputed claim term may a court resort to extrinsic evidence. *Civilized Ventures, Inc. v. Terra L.P.*, 112 F.3d 1146, 1152 (Fed.Cir.1997).

To define the scope of the patented invention, the Court must look first at the words of the claims themselves. *Pitronics Corp.*, 90 F.3d at 1582 (citing *Bell Communications Research, Inc. v. Katolik Communications Corp.*, 55 F.3d 615, 620 (Fed.Cir.1995)). Words in the claim are generally given their ordinary and customary meaning as understood by someone skilled in the art. However, "a patentee may choose to be his own lexicographer" and assign special definitions to the words in the claim, as long as those definitions are clearly stated in the patent specification or file history. *Id.* (citing *Harshat Celanese Corp. v. BP Chem. Ltd.*, 78 F.3d 1575, 1578 (Fed.Cir.1996)). Therefore, "it is always necessary to review the specification to determine whether the inventor has used any terms in a manner inconsistent with their ordinary meaning. The specification acts as a dictionary when it expressly defines terms used in the claims or when it defines terms by implication." *Id.* (citing *Martinez*, 52 F.3d at 979). The Federal Circuit has stated that "claims must be read in view of the specification, of which they are a part." *Id.* (citing *Martinez*, 52 F.3d at 979); see also *Start v. Loctech, Inc.*, 254 F.3d 1334, 1341 (Fed.Cir.2001) ("it is certainly correct that the specification and the prosecution history should be consulted to construe the language of the claims."). Because the specification must contain a description sufficient to enable those of ordinary skill in the art to make and use the invention, the specification "is the single best guide to the meaning of a disputed term." *Kumagai*, 90 F.3d at 1582.

The Court also may consider the prosecution history of the patent. *Id.* (citing *Martinez*, 52 F.3d at 980; *366 *Graham v. John Deere*, 383 U.S. 1, 33, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966)). The prosecution history is the complete record of the proceedings before the Patent and Trademark Office. During the course of these proceedings, the applicant may have made express representations regarding the scope of the in-

vention, so the prosecution history is "often of critical significance to determining the meaning of the claims." *Id.* (citing *Martinez*, 52 F.3d at 980; *Southwall Tech., Inc. v. Cardinal IG Co.*, 34 F.3d 1570, 1576 (Fed.Cir.1995)). Claim terms may appear to contain plain language, but the prosecution history may demonstrate that the claims do not cover some matters that would otherwise be encompassed in the plain meaning of the words used. Prosecution histories often contain an analysis of the distinctions between the prior art and the applicant's claims, providing the Court with clues to limitations of the claims. *Id.* at 1573; *Ampco Co. of America v. United States*, 181 Ct.Cl. 55, 384 F.2d 391, 399 (1967). Furthermore, "the prosecution history limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution." *Southwall Tech., Inc.*, 34 F.3d at 1576. Even when the written description would otherwise support a construction, the prosecution history, which is generated afterwards, can relinquish coverage of a claimed embodiment. *Rheor, Inc. v. Enger*, 270 F.3d 1319, 1325-27 (Fed.Cir.2002).

[2] For process or method claims like the ones at issue here, claim interpretation may involve ascertaining whether the claim may be interpreted to require that the steps be performed in a specific order. *Intergetter Gift Services, Inc. v. Computer, Inc.*, 256 F.3d 1321, 1342 (Fed.Cir.2001). The Federal Circuit recently crafted a two-part test, both prongs of which involve only intrinsic evidence, to determine whether the steps included in a process claim must be performed in the recited order:

First, we look to the claim language to determine if, as a matter of logic or grammar, they must be performed in the order written ... If not, we next look to the rest of the specification to determine whether it "directly or implicitly requires such a narrow construction."

Altiris, Inc. v. Symantec Corp., 318 F.3d 1263, 1269-70 (Fed.Cir.2003) (internal citations omitted).

[3] Ordinarily, terms are to be construed so that they have the same meaning throughout a patent. *Southwall Technologies, Inc. v. Cardinal IG Co.*, 34 F.3d 1570, 1574 (Fed.Cir.1995). Finally, claim lan-

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guage should be read in a manner that causes the claim to make sense: courts are to construe claims so as to sustain a patent's validity where possible. *ACS Hosp. Sys., Inc. v. Montefiore Hosp.*, 732 F.2d 1572, 1577 (Fed.Cir.1984).

Background of the Patents At Issue

In this case, there are four patents in suit.

The '207 patent describes a hot lamination process for manufacturing a "contactless smart card" with an embedded electronic element and an aesthetically pleasing, smooth finished surface that is capable of receiving dye sublimation printing. See, e.g., '207 patent, Abstract, Ex. 1 to Declaration of James David Jacobs, dated Nov. 5, 2004 ("Jacobs Decl."). Noting increased credit card and ATM fraud, the Background of the Invention for the '207 patent elaborates that this particular type of smart card-with its embedded computer chip that is capable of storing information about the holder-is intended to fill "a need in the plastic card industry to provide a more secure plastic card that is very difficult or impossible to fraudulently manipulate." '207 patent, col. 1:52-54. To that end, the '367 embedded electronic element "may perform a wide variety of functions and take a wide variety of forms." '207 patent, Detailed Description of the Invention, col. 3:35-37. In addition, the process described in the '207 patent (which yields a card that complies with all industry standards and specifications) is not as expensive or difficult as other smart card processes, and produces a more aesthetically pleasing card than prior patented processes-i.e., a thinner, smoother card that can receive dye sublimation and so does not reveal its embedded computer chip. '207 patent, col. 1:58-col. 2:13.

Claim I of the '207 patent (an independent claim) is representative of the context of most of the disputed terms at issue in this suit (bolded): **EN1**

EN1. The parties do not cite to the same sections of the Patents for the context of the disputed terms, however neither party appears to contest the context relied upon by the other. Plaintiff, for example, cites to the '207 and '989 patents in the beginning of its

brief, and indicates that the context is representative of the '155 and '367 patents, respectively. (See, e.g., Pl. Br. at 4, n. 4.) This would appear to be accurate; as discussed below, the Patents are all continuations or continuations-in-part of the '207 patent. Therefore, for purposes of this *Markman* decision, I will refer to the Patents where possible, and to the briefs where necessary to avoid confusion.

A process for incorporating at least one electronic element in the manufacture of a plastic card, comprising the steps of: (a) providing first and second plastic core sheets; (b) positioning said at least one electronic element in the absence of a non-electronic carrier directly between said first and second plastic core sheets to form a core, said plastic core sheets defining a pair of inner and outer surfaces of said core; (c) positioning said core in a laminator apparatus, and subjecting said core to a heat and pressure cycle, said heat and pressure cycle comprising the steps of: (i) heating said core for a first period of time; (ii) applying a first pressure to said core for a second period of time such that said at least one electronic element is encapsulated by said core; (iii) cooling said core while applying a second pressure to said core; (d) coating at least one of said outer surfaces of said core with a layer of ink; and (e) applying a layer of overlaminate film to at least one of said outer surfaces of said core. '207 patent, col. 6:18-40. (See *also* Declaration of Neil O. Cohen in Support of Plaintiff's Brief in Support of Its Claim Construction ("Cohen Decl."), Vol. 2 at L2-4.)

Claim 16 of the '207 patent (also an independent claim) includes in the first chronological step of the heat and pressure cycle the following additional instruction, which incorporates additional disputed terms:

(i) heating said core in a laminator, in the presence of a minimal first ramp pressure, to a temperature which causes controlled flow of said plastic which makes up said first and second plastic core sheets; (ii) applying a second pressure uniformly across said core for encapsulating said at least one electronic element within said controlled flow plastic; (iii) sub-

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sequently cooling said core in conjunction with the concurrent application of a third pressure uniformly across said core.

'207 patent, col.8: 12-32.

In plain English, the '207 patent teaches that an electronic element is positioned between plastic sheets to form a "core." The specification acknowledges that these "electronic elements ... and their insertion into plastic cards is not new, however, the present invention provides a new hot *368 lamination process for manufacturing plastic cards ... with these electronic elements." '207 patent, col. 3:53-62. (See also Pl. Br. at 4.) Specific disclosed examples of the electronic element include microchips connected to various types of antennas and "any other suitable electronic element." '207 patent, col. 3:48-52. During oral argument at the Martinez hearing, the court likened this "core" to a sandwich, in which the plastic sheets were the pieces of bread and the electronic element was the filling.

Once created, the plastic core "sandwich" is then placed in a laminator between upper and lower "platens," one of which is movable. The laminator heats, cools and applies hydraulic pressure to the core via intermediate layers consisting of "laminating pads" and "steel plates." Id. at col. 4:22-40. (See also Pl. Br. at 5.) The core and the intermediate layers form a "book." '207 patent, col. 4:33-40.

A first lamination cycle is initiated by closing the laminator platens and applying little or no pressure to the book. '207 patent, col. 4:41-44. A heat cycle is initiated to bring the temperature of the platens up for a predetermined period of time (e.g., 275-400° F for more than 5 minutes). '207 patent, col. 4:44-48. (See also Pl. Br. at 5.) The pressure of the laminator is then increased to facilitate the flow of the plastic core sheets to encapsulate the electronic element within the sheets. '207 patent col. 4:48-54. (See also Pl. Br. at 5.) The pressure cannot be too great or it will damage the electronic element.

The laminator then applies a chill cycle to the book in which the pressure of the laminator is increased until the platens have cooled to a predetermined temperat-

ure for a predetermined period of time (e.g., approximately 40-65° F for approximately 10-15 minutes). '207 patent, col. 4:66-5:5. (See also Pl. Br. at 5-6.)

The core is then removed from the laminator, whereupon it may be coated on at least one of its outer surfaces with a layer of ink. '207 patent, col. 5:6-12. A clear layer of overlaminates film may be applied to the ink-coated core. Id. at col. 5:25-31. Individual cards may be cut out from the laminated core. Id. at col. 5:67-604.

The '155 patent application was filed approximately two years after the '207 application. (See Def. Br. at 10.) The '155 patent application is a continuation of the '207 patent application and duplicates in all substantive respects the '207 patent specification. (Id.) The similarities between the '155 and '207 patents are substantial. Looking just at the independent claims: claim 1 of each is identical, except that claim 1 of the '155 patent omits the ink-coating step; and claim 15 of the '155 patent is the same as claim 16 of the '207 patent, except that claim 15 of the '155 omits the printing step. The lamination process claimed in the '207 and '155 patents, including the serial steps of heating, cooling and applying pressure, is identical. (Id.)

Leighton filed the application that matured into the '099 patent approximately 10 months after filing the application that matured into the '207 patent. The '099 patent is a continuation-in-part of the '207 patent application. (Id. at 8.) Whereas the '207 patent is directed to the hot lamination process for creating a contactless card, the '099 patent is directed to a dual function card—a combination contact/contactless card. (Id.) Despite the fact that the patents relate to different types of cards, the specifications of the '207 and '099 patents share virtually the same disclosure. There is, however, an additional step involved in creating the dual function card, which includes the last group of additional terms: "mill[ing] a region of said core to a controlled depth so as to form a cavity which exposes at least *369 one contact pad of said electronic element," and "insert[ing] a second electronic element into said cavity, the second electronic element being in electrical communication with the at least one electronic element." '099 patent, col.

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9:3-5, col. 10:17-19; *see also* '367 patent, claims 1, 22, 23.

This additional step allows for placement of a second electronic element into the cavity to facilitate the contact function of a dual function card.

Leighton filed the application that matured into the '367 patent approximately three years after the '207 application, and approximately two years after filing the application for the '099 patent. (See Def. Br. at 11.) The '367 patent application is a continuation of the '099 patent and, except with respect to matters not relevant here, the specifications are identical. (*Id.*) It is also a continuation-in-part of the '207 patent. The '367 patent, like the '099 patent, describes a hot lamination process for creating a dual function contact/contactless smart card, and so it contains the "milling" step and insertion of a second electronic element as in the '099 patent.

The main difference between the contactless card process (the '207 and '155 patents) and the dual function card process (the '099 and '376 patents) appears to be that one or more electronic elements are embedded during lamination in the plastic core sheets in the process described by the former patents, whereas in the latter patents, in addition to that embedding, another electronic element is inserted into a milled cavity after lamination to allow the card to function in either a contact or contactless mode. (See, e.g., Pl. Br. at 10, describing Figures 1 and 2 of the '099 patent.)

Significantly, there is nothing—a container, no recess and no physical buffer of any sort—that protects the embedded electronic element during lamination in any of the Patents at issue here—whether a micro-chip and antenna, or just an antenna. See, e.g., '207 patent, col. 6:23-25. Both parties acknowledge that the absence of a "buffer" or "buffer zone" is the critical improvement of these patents over prior art, specifically over U.S. Patent No. 4,450,024, which required protection for the electronic element during lamination. See, e.g., '024 patent, col. 6:60-7:8.

Indeed, the Patent Office initially rejected application Claims 1-19 of the '207 patent as being obvious over the '024 patent. (Pl. Br. at 19.) Claim 1 of the '207

patent originally recited:

1. A hot lamination process for the manufacture of a plastic card, said process comprising the steps of: (a) providing first and second plastic core sheets; (b) positioning at least one electronic element between said first and second plastic core sheets to form a layered core.

(*Id.*) In response to the Patent Office's rejection, the bolded language was modified to read, "electronic element in the absence of a non-electronic carrier directly between said first and second plastic core sheets..." (*Id.* (emphasis added).) This modified language appears in each of the four Patents, to reflect this same improvement. In distinguishing the '207 patent from the '024 patent, Leighton noted that the '024 patent required that the "electronic element ... be placed in a protective carrier disk," which protection is not necessary in the '207 patent (or any of the Patents at issue in this case). (Pl. Br. at 20.) Thus, Leighton's modification of the language indicated that the '207 patent—and the rest of the Patents—improved on the '024 patent by eliminating the need to specifically protect the electronic element during lamination.

Construction of the Disputed Terms

With one key exception, Obarthur and Leighton agree that all the terms should "378 be defined in the same way across all four related Patents. Obarthur believes that the term "electronic element" cannot be defined in the same manner for the '367 and '099 patents as it is for the '207 and '155 patents—and, indeed, argues that it cannot be defined at all for the former patents. I disagree.

1. "Electronic Element"

[2] This term will be defined as "a device or thing that has (1) distinct characteristics related to electricity; together with (2) terminals at which it may be connected to other distinctly electrical devices or things in order to form a circuit (3) in which electrons move through devices called semiconductors."

The phrase "electronic element" appears in claim 1 of each of the four Patents: "A process for incorporating at least one electronic element in the manufacture of

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a plastic card ... positioning said at least one electronic element in the absence of a non-electronic carrier directly between said first and second plastic core sheets to form a plastic core..." 207 Patent, Claim 1; 155 Patent, Claim 1; 099 Patent, Claim 1; 367 Patent, Claim 1; 367 Patent, Claim 20. (See also Cohen Decl., Exh. L.)

It also appears in the following language of the 207 and 155 patents: "[P]ositioning at least one electronic element in the absence of a non-electronic carrier directly between said first and second plastic core sheets..." 207 Patent, claim 16 and 155 Patent, Claim 15. (See also Cohen Decl., Exh. L.) "Electronic element may take a wide variety of forms and perform a wide variety of functions. As shown ... electronic element may be provided by a micro-chip and a circuit board antenna, a read/write micro-chip and a wire coil antenna, or any other suitable electronic element." 207 Patent, Specification, col. 3:46-52 (internal references omitted).

The specification of the 099 patent states that the "electronic element may take a wide variety of forms (microprocessor chip, circuit board, transponder, etc.)." (Pl. Br. at 15-16, quoting the 099 Patent at col. 4:35-37.)

Plaintiff urges that an "electronic element" in all of the patents in suit should be construed to mean "a device having distinct electrical characteristics and having terminals at which it may be connected to other elements to form a circuit that utilizes a semiconductor device." (Pl. Br. at 14).

Defendants urges that the term be construed to mean "A microchip and an antenna" in the 207 and 155 patents. Defendant further contends that the term is ambiguous in the context of the 099 and 367 patents, and thus cannot be defined at all.

Because this is the most hotly contested term, and its definition is critical to the construction of the patents, I will summarize the parties' arguments in some detail. *Definitional Sources:*

Plain Meaning: Both parties place great reliance on dictionary definitions. Yet while using the same dictionary, they come up with two different "plain"

meanings for this key phrase.

Plaintiff notes that the Dictionary of Scientific and Technical Terms (McGraw Hill, 5th ed. 1994) ("McGraw Hill") does not contain a definition for the phrase "electronic element." But it does define both the word "electronic" and the word "element." ^{FN2} So Plaintiff puts those two definitions together and argues that the "definitions of the words that make up this term *371 provide a clear ordinary meaning." (Pl. Br. at 14).

^{FN2} Both parties agree on the use of the McGraw Hill Dictionary of Scientific and Technical Terms.

Plaintiff cites to the definition the word "element," as "component," which in turn is defined as, "any electric device ... having distinct electrical characteristics and having terminals at which it may be connected to other components to form a circuit." *Id.* at 424. McGraw Hill defines "electronic" as "[p]ertaining ... to circuits ... utilizing electron devices ..." *Id.* at 461, and defines "electron device" as "a device in which conduction is principally by electrons moving through a vacuum, gas, or semiconductor." *Id.* at 460. Observing that vacuum and gas conduction are irrelevant to the patents in suit, Plaintiff notes that McGraw Hill defines the term "semiconductor device" as an "electronic device in which the characteristic distinguishing electronic conduction takes place within a semiconductor." *Id.* at 1799. McGraw Hill (6th ed.2003), p. 1895 also defines "semiconductor" to mean, "A solid crystalline material whose electrical conductivity is intermediate between that of a conductor and an insulator, ranging from about 10^{-5} mhos to 10^{-7} mho per meter, and is usually strongly temperature-dependent." Plaintiff makes no reference to this definition.)

Defendants agree with Plaintiff's definition of the word "electronic" and also with Plaintiff's observation that the word "element" is synonymous with "component." But taking off from that, they observe that McGraw Hill—while lacking a definition for the phrase "electronic element"—does contain a definition for the phrase "electronic component." And it is not the same as the combined definition of the words

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"electronic" and "element" crafted by Plaintiff. Rather, "electronic component" means, "A component which is able to amplify or control voltages or current without mechanical or other non-electrical command, or to switch currents or voltages without mechanical switches; examples include electron tubes, transistors, and other solid-state devices." McGraw Hill at 701. Defendant argues that this is superior to a definition that combines the separate definitions for the terms "electronic" and "component" because, *inter alia*, the term "component" as defined by McGraw Hill relates to the wrong field—Electricity as opposed to Electronics—and is therefore not apt. ^{FN3}

^{FN3} I find it interesting that McGraw Hill contains no definition for the term "element"—the admitted synonym for "component" (and the word Leighton actually uses in the patent)—that falls within the field of Electronics, either. Indeed, the "element-component" synonym that Defendant invokes in order to turn my attention to the phrase "electronic component" (which is not the phrase used in the patent) is found under the heading Electricity, not Electronics, which turns Defendant's argument back on itself.

It is important to Defendant that I prefer the definition of "electronic component" over Plaintiff's combined definition of the separate terms "electronic" plus "component" because the definition of "electronic component" incorporates (and, according to Defendant, is limited to) "solid-state devices." That term is defined by McGraw Hill to mean, "A device, other than a conductor, which uses magnetic, electrical and other properties of solid materials, as opposed to vacuum or gaseous devices." The italicized language (which appears to limit "electronic components" to solid-state devices, such as microchips) is critical to Defendant for two reasons. First, Defendant argues that the only solid state device that satisfies the criteria of the patent is a microchip. Second, in the '099 and '367 patents, a bare antenna, which is a conductor (and thus not a solid state device), is embedded. It is that, Defendant argues, which renders the term "electronic element" indefinable in connection with those two patents.

*372 The fact that both parties agree that the word "component" is synonymous with the patentee's chosen word "element," and that there is a definition for the phrase "electronic component" in McGraw Hill, might be thought to solve the definitional conundrum. Indeed, there is a certain Occam's Razor kind of elegance to Defendant's point.

However, there are two serious flaws with this argument. First, defining "electronic element" to exclude a conductor, like an antenna, reads a disclosed embodiment (in the case of the '099 patent, the preferred embodiment) out of the patent. Adopting that definition is thus inconsistent with the rules that claims are to be construed so as to (1) make sense and (2) be consistent with the specifications.

Second, as is so often the case with scientific and technical definitions, Defendant's proposed definition is tautological—that is, it contains the very word ("component") that it purports to define. To be useful to a jury, the construction of the phrase "electronic component" cannot define the word "component" as "a component." ^{FN4} Since there is no clue within the definition of "electronic component" to what a "component" might be (other than a non-exhaustive list of examples, about which more in a moment), one could only craft a workable definition of "electronic component" by incorporating into it the definition of the undefined word—"component"—that appears elsewhere in the McGraw Hill Dictionary. Of course, Defendant does not want me to do that, because then we would end up with Plaintiff's definition (or its functional equivalent):

^{FN4} Since Defendant insists (and Plaintiff agrees) that "component" is synonymous with "element," I could turn to yet another dictionary—the Oxford English Dictionary, which is used by persons not skilled in my art except the art of looking up words—and find a definition of "element" that fits quite nicely into the language of the patent: "a constituent part." However, that definition would be far too broad to fit within Plaintiff's claimed invention (see below at 374-375).

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What should be obvious from all of the above is that I cannot fashion a so-called "ordinary meaning" definition of the term "electronic element" by using a dictionary alone. Nor should I. When interpreting terms used in a patent, one is required to look at how the term is used in the patent itself and in its prosecution history, to see if that use is consistent or inconsistent with any dictionary definition. It is to that exercise that we now turn.

Specifications: The specifications for the '207 patent certainly do not suggest that the term "electronic element" should be defined as narrowly as Defendant urges. For example, it says:

Electronic element 20 may take a wide variety of forms and perform a wide variety of functions...[It may include] a micro-chip 22 including a wire antenna 24 connected thereto, a micro-chip 22 and a circuit board antenna 24, a read/write micro-chip 22 and a wire coil antenna 24, or any other suitable electronic element.

Similarly, in the related '099 patent, "Electronic element 20 may take a wide variety of forms (microprocessor chip, circuit board, transponder, etc.)." And as noted above, Fig. 4, one of the disclosed embodiments of the '099 patent, shows the electronic element to be a bare antenna.

Plaintiff has specifically disclaimed to the court any effort to invoke patent rights in whatever the "electronic element" might be. However, Plaintiff's use of broad language in the specifications clearly evinces an attempt to include any sort of electronic element that presently can or might in the future be usefully implanted in a smart card-not just micro-chips and antennas, *373 which appear to be the preferred embodiment given today's technology.

[6] Defendant correctly notes that all of the disclosed embodiments in the '207 and '155 patents are variations on the "micro-chip plus antenna" theme, and all the disclosed embodiments in the '099 and '267 patents are variations on the "micro-chip or antenna" theme. But it is hornbook law that a patent is not limited to its disclosed embodiments. *Label-Fluorine Co. v. Medrad, Inc.*, 338 F.3d 898, 906 (Fed.Cir.2004) (unless patentee specifically indicates

such a limitation, claims should not be construed as limited to embodiments of invention having a particular feature simply because all embodiments disclosed in the specifications share that feature). A review of the file wrapper does not disclose anything suggesting that Leighton ever disclaimed the use of any type of electronic device in connection with its process during the prosecution of the patent, so Oberthor cannot invoke any patent estoppel to limit the patent's scope to the disclosed embodiments.

Plaintiff further argues that construing "electronic element" to mean "micro-chip and antenna" with respect to the '207 and '155 patents would violate the doctrine of claim differentiation. Under this doctrine, each claim in a patent is presumed to have a different scope. See, e.g., *Kenda Corp. v. Ag-Bar Int'l Ltd.*, 392 F.3d 1325, 1329-30 (Fed.Cir.2004). "The difference in meaning and scope between claims is presumed to be significant '[t]o the extent that the absence of such difference in meaning and scope would make a claim superfluous.' " *Id.* (quoting *Zandon Corp. v. United States Int'l Trade Comm'n*, 831 F.2d 1017, 1023 (Fed.Cir.1987)). Therefore, limitations of dependent claims are not read onto independent claims, because to do so would render the independent claims superfluous as duplicative of the dependent claims.

In the '207 patent, dependent claims 13 and 14 of the '207 patent narrow the scope of the term "electronic element" as it appears in independent claim 1 by specifying that the "electronic element" must be "a micro-chip and an associated wire antenna" (claim 13) or "a micro-chip and an associated circuit board antenna" (claim 14). Defining "electronic element" to mean only "a micro-chip and an antenna" would improperly impose the limitations of dependent claims 13 and 14 onto independent claim 1. Defendant fails to refute this argument.

Prosecution History: Plaintiff also argues that the prosecution history of these patents demonstrates that the term "electronic element" as used in the patents in suit should be read as broadly as Plaintiff urges-and, moreover, that a person of ordinary skill in the art would so read it.

One of the critical prior art patents is U.S. Patent No.

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5,319,201, a prior art patent that is cited in the prosecution history of the '367 patent. This patent relates to "smart card" technology. Persons skilled in the art would be expected to be familiar with this patent.

The '201 patent contains the following language concerning the electronics that make smart cards work: Some identification cards include an integrated circuit and are known as 'integrated circuit cards' or 'Smart Cards.' More generally, herein, 'Smart Card' refers to any portable card-like device which includes one or more electronic components, i.e., active components such as integrated circuits, transistors and diodes, and passive components such as resistors, capacitors and inductors.

Col. 1:32-38.

Elsewhere in the '201 Patent, the inventor states that electronic elements (or components, as he calls them) can include:

integrated circuit modules, transistors, diodes, and passive components such as "374 resistors, inductors and capacitors. Further, an integrated circuit module for use with the invention can be a printed circuit board to which is attached one or more integrated circuit chips, a printed circuit board without an integrated circuit chip attached, or just an integrated circuit chip.

(Pl. Br. at 16, quoting the '201 patent at col. 2:55-64.) This language is extremely broad and does not at all suggest that "electronic elements" in "smart cards" are limited to micro-chips and their antennas. ^{FN5} Nor does it support Defendant's argument that the term "electronic element" as used in the '367 and '399 patents is indefinable because an antenna—which all parties agree is a "passive component" or an "inductor"—falls outside the ambit of "electronic elements." Defendant urges the Court to read those passages (in particular the former passage) such that only "active components" are encompassed within the reach of the term "electronic components," but such a reading defies logic as well as basic principles of English grammar. ^{FN5}

^{FN5} Similarly, the prior art U.S. Patent No.

5,412,192, cited in the provisional application for the '207 patent and teaching a system for changing the activation status of a data card, such as a charge card, uses the phrases "internal electronics" to refer to the "wire coil antenna and micro chip" of the '207 provisional application and defines that phrase in an extremely broad manner to include "battery, fuses, crystal display, and photocell." ('207 Provisional Application at 19).

^{FN6} The quoted language in the '201 patent also indicates that Defendant's proposed use of the McGraw Hill definition of "electronic component" for the patents in suit is misplaced since it would read out the "passive components" included within the category of "electronic component" used in the '201 patent.

Defendant argues that an antenna cannot possibly be an electronic device because it is an electromagnetic device (according to McGraw Hill), which is something entirely different. However, as noted above, the word "electronic" means "pertaining to electron devices." Antennas "pertain" or relate to "electron devices" by functioning with them to complete the circuitry that embodies the "smart card" technology.

Moreover, the prior art patents draw a distinction between active and passive electronic devices, with the latter plainly including devices that function using electromagnetic action. For example, the '201 patent notes that "electronic components" can include "passive components" such as "inductors," which would encompass antennas. '201 patent, col. 1:32-38.

Result

It is easy to reject Defendant's proposed definition of "electronic element" as "a combination of a microchip and an antenna" with regard to the '207 and '355 patents. Such a construction, as Plaintiff correctly observes, would violate almost every rule of claim construction. It is inconsistent with the broad language used in the specifications. It is inconsistent with prior

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art patents that use the same term. And it is far narrower than even the dictionary definition of the phrase "electronic component" that Defendant advances.

It is equally easy to reject Defendant's argument that the term "electronic element" is used differently in the '376 and '099 patents, and cannot be defined at all as used in those patents because one disclosed embodiment identifies something (an antenna) that is not, in fact, an electronic element. Defendant's thesis that this term is used differently in the latter two patents is entirely dependent on acceptance of its extremely narrow construction of the term "electronic element," which "limits that term to a combination of a microchip and an antenna." ^{FN7} Since I '375 have rejected that narrow construction, I must reject the argument based thereon. And the preceding discussion highlights the flaws in Defendant's claim that the term cannot be defined.

^{FN7} Specifically, Oberthur claims that because the '099 patent and '367 patents indicate that the embedded "electronic element" is only an antenna-not a micro-chip and antenna-this distinction renders the term ambiguous. (Def. Br. at 51.) Unless the definition of "electronic element" is confined to "microchip and antenna"-an argument I decline to accept-this argument makes no sense.

This leaves me with the task of deciding whether Plaintiff's proposed definition (or some variant on it) is the correct construction of the term, based solely on intrinsic evidence. As I make this decision, I must keep in mind that claim construction is essentially the crafting of a jury instruction, so the term definition must be comprehensible by a lay juror as well as one skilled in the art.

Leighton's proposed definition is "a device having distinct electrical characteristics and having terminals at which it may be connected to other elements to form a circuit that utilizes a semiconductor device." This combines the following definitions (from McGraw Hill):

Electronic: pertaining...to circuits...utilizing electron

devices

Electron devices: a device in which conduction is principally by electrons moving through a...semiconductor

Semiconductor Device: an electronic device in which the distinguishing electronic conduction takes place within a semiconductor

Component: any electric device...having distinct electrical characteristics and having terminals at which it may be connected to other components to form a circuit.

Plaintiff's invocation of the McGraw Hill definition of "component" rules out the use of a broader, less technical definition for the word element, such as "a constituent part." This is consistent with the argument made in Plaintiff's brief that, because the word "electronic" modifies "element," the patentee claims use of just one specific type of circuit-one that uses a semiconductor device.

Coupling this with the broad wording of the specification ("Electronic element 20 may take a wide variety of forms...") and the equally broad use of the term electronic element and the analogous term electronic component in critical prior art patents, I conclude that to construe this term with reference solely to intrinsic evidence we must define additional terms (from McGraw Hill):

Semiconductor: a solid crystalline material whose electrical conductivity is intermediate between that of a conductor and an insulator...

Conductor: a wire, cable or other body or medium that is suitable for carrying electric current.

Insulator: a device having high electrical resistance and used for supporting or separating conductors to prevent undesired flow of current from them to other objects.

Electrical: related to or associated with electricity, but not containing or having its properties or characteristics.

I craft the following instruction to give to the jury concerning the phrase "electronic element":

Ladies and gentlemen, the first term that I must define for you is "Electronic element." That is a technical term. The word "electronic" means "pertaining to circuits that use something called electron

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devices." An electronic device, for the purposes of this patent, is a device or thing in which electrical current is carried ("conducted" is the technical term) principally by electrons moving through something called a "376 semiconductor. So electronic means "pertaining to circuits utilizing a semiconductor device." An "element" is the same thing as a "component," and a "component" is an electrical device (something that has distinct characteristics related to or associated with electricity) and that has terminals, or end points, at which it can be connected to other components to form a "circuit," which is a combination of electrically interconnected components. So "electronic element" means "a device or thing that has distinct characteristics related to electricity, and that also has terminals at which it may be connected to other distinctly electrical devices or things in order to form a circuit, in which electrons move through devices called semiconductors."

2. "Non-Electronic Carrier"

[Z] A "non-electronic carrier" means, "A device that holds an electronic element to protect it from physical damage during lamination, where the device is not part of a circuit that utilizes a semiconductor device."

Plaintiff states that the phrase "non-electronic carrier" generally appears in the claims at issue in the following context: "positioning said at least one electronic element in the absence of a non-electronic carrier directly between said first and second plastic core sheets." (Pl. Br. at 18, citing Cohen Decl. at Exh. L, p. 2.) Defendant refers to the same language in claim 1 of the '207 patent. Thus, as noted above, the essence of the Patents is the lack of any "non-electronic carrier."

According to Plaintiff, a "carrier" is defined as a "compartmentalized holder used for storing, transporting, hauling, and testing electronic devices to protect them from physical damage." (Pl. Br. at 18, quoting the Electronic Packaging, Microelectronics, and Interconnection Dictionary ("EPMI Dictionary"), p. 26.) Plaintiff refers to its prior definition of "electronic" as "pertaining to circuits utilizing semiconductor devices," and to Webster's Collegiate Dic-

tionary (10th ed. 1999) ("Webster's"), p. 788, for the definition of "non-" as negating the "usual esp[ecially] positive characteristics" of "electronic." (Pl. Br. at 18.)

Plaintiff also urges that these dictionary meanings should be modified to reflect the prosecution history of the '207 patent, discussed above, during which Leighton clarified that no buffer zone or protection was needed for the embedded electronic elements during lamination in any of the Patents. (See discussion supra at 369.)

Based on the dictionary definitions and the prosecution history, therefore, Plaintiff argues that a "non-electronic carrier" should be construed to mean "a holder used for electronic devices to protect them from physical damage, which device is not part of a circuit that utilizes a semiconductor device." (*Id.* at 372-373.) Plaintiff omits from the dictionary definitions cited above words that it claims would be inaccurate here (i.e., compartmentalized, storing, transporting, hauling, and testing).

Defendant's proposed definition is very similar, and reads, "A structure without any substantial electronic function, such as a recess, buffer or protective carrier, that at least partially protects during lamination the 'electronic element' from damage caused by lamination pressure." (Def. Br. at 22.) Defendant also relies on the prosecution history of the '207 patent to support the idea that the significant difference between the '207 patent and the '024 patent is the fact that the '207 patent does not require protection of the electronic element during the lamination process. (*Id.*) Defendant additionally concludes and I agree that Leighton relinquished any interpretation of "non-electronic carrier" "377 that includes any protection for the electronic element. *Southwall Techs., Inc. v. Cardinal IG Co.*, 54 F.3d 1570 (Fed. Cir. 1995). (See Def. Br. at 22.) Defendant notes that Leighton made the same arguments about the absence of protection of the electronic element during prosecution of the '024 patent. (Def. Br. at 52.)

I agree with the parties that Leighton intended to distinguish the Patents at issue here from the '024 patent on the basis of, among other things, the fact that no

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protection is needed for the electronic element during lamination in the Patents at issue. Plaintiff's construction of the phrase "non-electronic carrier" addresses this issue without redundancy or ambiguity. I therefore adopt it *in hoc verba*.

3. "Directly"

"Directly" means, "In immediate physical contact."

[8] Plaintiff states that "directly" appears in each claim in the following context, "positioning said at least one electronic element in the absence of a non-electronic carrier directly between said first and second plastic core sheets." (Pl. Br. at 21; Cohen Decl., Exh. 1.) Defendant refers to the same language in claims 1 and 16 of the '207 patent. (Def. Br. at 25.)

Both parties cite to Webster's for the definition of "directly" as meaning "in immediate physical contact." (Pl. Br. at 21; Def. Br. at 25.) Plaintiff rests on this. Defendant urges additional language, however, defining "directly" to mean that "there is nothing between the 'electronic element' and the first plastic core sheet and nothing between the 'electronic element' and the second plastic core sheet." (Def. Br. at 25.) That just says the same thing in more words that add nothing to the definition. I therefore elect to go with Plaintiff's sparser and more elegant version.

4. "Comprising the Steps Of"

This phrase is-or ought to be-self-explanatory. However, Defendant contends that these words mean that the steps recited in the patent must be performed in the exact order indicated in the patent.

The words themselves admit of no such meaning. "Comprising" means "being made up of," and nothing more than that. ^{ENB} "Step" means "a stage in a process" (both definitions of these plain English, utterly non-technical words are taken from Webster's New Collegiate Dictionary). Neither of these words necessarily implies that there is any particular order in which the steps must be taken.

^{ENB} It certainly does not mean "additional," as argued by Plaintiff in its *Markman* hearing presentation.

Defendant argues that if the steps are not performed in the order indicated, the end product will not be a plastic card with a sufficiently smooth surface to receive dye sublimation printing. (Def. Br. at 29.) That may be or it may not be, but there is nothing in the words "comprising the steps of" that imparts the concept of order. At various points in the patent claims, Plaintiff does use "ordering" language-for example, Leighton's use of the word "subsequently" in claim 15 of the '155 patent and claim 16 of the '207 patent means that step (c)(ii) must follow step (c)(i). Similarly, the use of words like "following" ('099 patent, claim 8, and '367 patent, claim 7); "prior to" ('367 patent, claims 8 and 14) and "after" ('367 patent, claim 22) expressly indicate that the patented intended things to flow in a sequential order. In the absence of such language, no order will be presumed. *Atrele Inc. v. Symantec Corp.*, 318 F.3d 1363, 1369 (Fed.Cir.2003).

*378 A variant of Defendant's argument, but a far more interesting one, will be found when we reach the issue of whether the use of the words "first" and "second" in several patent claims fairly implies sequential ordering, or is simply an attempt to distinguish between different applications of pressure without imparting any order. But that is for later discussion.

5. "Encapsulated By and Encapsulating"

[9] The phrase "encapsulated by" is construed to mean, "Enclosed by," and "encapsulating" is construed to mean, "Enclosing."

Plaintiff again argues that the plain meaning of these words suffices to construe them for the jury. I agree.

The phrase "encapsulated by" appears in claim 1 of the '207 patent as follows: "positioning said core in a laminator apparatus, and subjecting said core to a heat and pressure cycle... applying first pressure to said core for a second period of time such that said at least one electronic element is encapsulated by said core." (Internal numerical references omitted). See also claims 17 of the '099 patent; claim 20 of the '367 patent; claim 1 of the '155 patent. Claim 16 of the '207 patent recites the term in the second step of the

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heat and pressure cycle "applying a second pressure uniformly across said core for encapsulating said at least one electronic element within said controlled plastic flow."

Defendant proposes that the phrase means: that the 'core' must fully enclose the 'electronic element' which has been placed 'directly' between the 'first and second plastic core sheets' so that even the sides of the 'electronic element' are surrounded by the 'first and second plastic core sheets.' That is, if the 'electronic element' is not placed directly between the 'first and second plastic core sheets' or has been already encapsulated by other material, the 'first and second plastic core sheets' cannot encapsulate the 'electronic element.'

(Def. Br. at 31.)

Defendant again uses far too many words to define a simple phenomenon. Webster's non-technical definition of "encapsulate" is "to enclose in or as if in a capsule." (Def. Br. at 31.) "Capsule" is defined as "a compact often sealed and detachable container or compartment." (*Id.*) Thus, according to Defendant, when an element is encapsulated by something, that something fully encloses the element, as though it were contained within a sealed compartment. Defendant notes that in the '207 specification, for example, the electronic element is "fully" sealed in by the plastic core sheets after lamination, and that nothing "intervenes between the core sheets and the electronic element." (Def. Br. at 32-33.) Leighton apparently amended "encapsulated in said core" to "encapsulated by said core" during the prosecution of the '207 patent, a revision the Defendant views as highly significant. (Def. Br. at 33, citing Office Action Response, p. 75 (emphasis added).) According to Defendant, "encapsulated in" would allow an intervening material, such as "air." By contrast, according to Defendant, "encapsulated by" precludes air and requires that the plastic core sheets completely surround and make contact with the electronic element. (*Id.*)

All this is interesting, but when parsed (as we did at the *Markman* hearing), it is apparent that Defendant is again trying to read the specifications out of the

definition and to render the patent meaningless. The patent discloses a process in which the first step is to place an electronic element between two sheets of plastic, thus making what the Court called "a sandwich." In this sandwich, the element touches both sheets of plastic and is not "379 shielded from them. However, for the plastic to touch every square millimeter of the electronic element at the moment the sandwich is made (which is while the plastic is still a solid, before it has been heated and liquified), the element would have to be completely planar. The electronic elements shown in the disclosed embodiments—such as microchips, wire coil antennas, circuit boards, transponders—are not completely planar. They are three dimensional objects, and they can have irregular surfaces. This means that, when the "sandwich" is made by placing the element between the two sheets of plastic, it is possible that not every square millimeter of the element will be touching the plastic. But these infinitesimal pockets of air do not take the "sandwich" out of the ambit of the claims in suit, because they do not "protect" the element from the plastic (so that when the plastic melts it will touch every square millimeter of the element) and so do not cross the great divide between this family of patents and the prior art '024 patent, which placed the element in a little container before melting the plastic sheets.

6. "Coating At Least One of Said Outer Surfaces of Said Core With a Layer of Ink"

[10] "Coating at least one of said outer surfaces of said core with a layer of ink" means, "Covering at least one of said outer surfaces of said core with a finishing layer of ink."

The only term in this phrase requiring construction is the word "coating."

Plaintiff's proposed definition is that "coating" means "covering." (Pl. Br. at 24.) Plaintiff cites Webster's, p. 219, for the ordinary meaning of "coating" as "2: to cover or spread with a finishing, protecting, or enclosing layer," and notes that the claims in the Patents specify that the layer is ink. (Pl. Br. at 24.)

Claim one of the '207 patent recites the coating step

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as follows:

(b) positioning said at least one electronic element ... directly between said first and second plastic core sheets to form a core, said plastic core sheets defining a pair of inner and outer surfaces of said core, (c) positioning said core in a laminator apparatus, and subjecting said core to a heat and pressure cycle..., (d) coating at least one of said outer surfaces of said core with a layer of ink, and (e) applying a layer of overlaminate film to at least one of said outer surfaces of said core.

'207 patent, col. 6:22-38. The specification further provides, "... the use of matte finished laminator plates provides surfaces with a slightly roughened or textured quality which will facilitate the application of a coating thereto..." '207 patent, col. 4:34-38. The Summary of the Invention in the '207 patent describes that "at least one of the upper and lower surfaces of the core compris[es] a coating printed or otherwise applied thereon," '207 patent, col. 2:20-24, and further explains that the "core is coated on at least one of its [sic] upper and lower surfaces with a layer of printing ink. This may be accomplished by a wide variety of printing techniques," '207 patent, col. 5:6-12.

The '099 patent contains similar language, using "coating" and "covering" interchangeably—"the sheet of plastic card stock ... comprises at least core with at least one surface thereof covered by a layer of ink," '099 patent, col. 7:45-51 (numerical references omitted). The prosecution histories of the '207 patent and the '099 patent clarify that "coating" is used to mean more than merely "printing on."

It is important to note that the word "core" is used in all of the patents to describe what I have termed the "sandwich"—that is, the electronic element and the two plastic sheets that directly touch it. Nothing more is included in the definition of the word "core."

FN9

FN9. Note that the "book," referred to earlier, is comprised of the "core" plus laminating pads and steel plates that facilitate the lamination process but are not a part of the finished product. See, e.g., '207 patent, col.

4:35-40.

Defendant proposes that "coating... with a layer of ink" means that "the ink layer must directly contact at least one of the 'outer surfaces' of the 'core.'" (Def. Br. at 34.) Defendant cites to the claim and specification language cited above in support of its definition. Defendant also notes that the '207 specification states that, "This printing step is performed to coat at least one surface of core with a layer of aesthetically pleasing ink." (Def. Br. at 35, quoting '207 patent, col. 5:6-17. (numerical references omitted).) Finally, Defendant notes that Leighton "did not disclose applying another layer with ink imprinted on it to an outer surface of the core itself," and then quotes the '207 patent, "This layer of ink cosmetically hides the one or more electronic elements that are embedded within core, and prevents these one or more electronic elements from showing through the relatively thin core." (Def. Br. at 35, quoting the '207 patent, col. 5:17-21 (numerical references omitted).) In sum, Defendant argues that the intrinsic evidence leads to the conclusion that "coating ... with a layer of ink" means the ink is applied to at least one of the "outer surfaces" of the "core," so the layer of ink "directly contacts that outer core surface." (Def. Br. at 25.)

As is clear from the above language, Defendant is trying to preclude Plaintiff from claiming that the patent covers a process wherein something is applied directly to the surface of the core before the surface is covered with ink. The analogy used by the parties at the Martinez hearing was as follows: Assume we are interpreting the sentence, "The table is covered with ink." Obviously, if a layer of ink is applied directly to the top surface of the table, the table is covered with ink. The question posed by the parties was whether, if a tablecloth were placed over the top surface of the table and the cloth were then covered with ink, the table would be covered with ink.

The answer is no. The table would then be covered with an ink-stained tablecloth. The ink would cover the cloth, and the cloth would cover the table. But the ink would not coat the table—it would coat the cloth. This notion of immediacy (or what Defendant calls direct contact) is implicit in the dictionary definition of "coat," which is "to cover or spread with a finish-

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ing, protecting or enclosing layer." Ink applied otherwise than to the surface of the core itself would not "finish" or "enclose" the core.

7. "Minimal... First Pressure"

[11] The word "minimal" in the phrase "minimal first ram pressure" means, "The smallest or least amount [of ram pressure] necessary to accomplish the designated step."

At the outset, I note that I am focusing here solely on the words "minimal... ram pressure" rather than on the entire phrase "minimal first ram pressure." This is because the parties greatly dispute what "first" means as used in this phrase, and this is not the place to discuss that issue. This phrase appears in claim 16 of the '207 patent, and claim 15 of the '155 patent: positioning said core in a laminator apparatus, and subjecting said core to a heat and pressure cycle ... comprising the steps of: (i) heating said core in said '383 laminator, in the presence of a minimal first ram pressure.

'207, col. 8:19-23; '155 patent, col. 8:15-19.

The specifications for the '207 patent indicate that "minimal" means "little or no." Col. 4:41-44.

Defendant proposes that this phrase means "applying little or no pressure to the 'core,' but in no event a ram pressure more than about 10 pounds per square inch."

According to Defendant, "minimal" is not a technical term, and it is defined in Webster's to mean "relating to or being a minimum; constituting the least possible size, number or degree." (Def. Br. at 36.) "Minimum" is defined in Webster's to mean, "the least quantity assignable, admissible, or possible." (*Id.*) To this extent, Defendant is precisely correct.

But Oberthur goes on to argue Leighton has capped the minimal first ram pressure at 10 pounds per square inch for all applications. (Def. Br. at 37.) It derives this number from language in the specifications for the '099 and '367 patents (whose claims, interestingly, do not use the phrase "minimal...ram pressure"). The '099 patent (col. 5:56-61) says this

about the amount of pressure required for a particular step:

One book is positioned in laminator ... the first lamination cycle is initiated by closing laminator platens preferably applying little or no ram pressure to book. This is preferably done using hydraulic pressure, and a pressure not to exceed about 10 pounds per square inch is believed sufficient for most applications.

'099 patent, col. 5:56-61 (numerical references omitted.)

I reject Defendant's proposed definition. The word "minimal" does not connote any sort of numeric cap. And to the extent the references in the '099 and '367 specifications to 10 p.s.i. are relevant at all, I am constrained to note that the patentee expressly states that he "believes" this amount of pressure will be "sufficient for most applications"—indicating that it is entirely possible that slightly more pressure (how much is not specified) may be needed for some applications.

But nothing in Webster's or the patent specifications remotely suggests that 10 p.s.i. of ram pressure will qualify as "the least possible size" in every possible case. Therefore, I reject Defendant's argument.

8. "First Pressure," "First Ram Pressure," "Second Pressure" and "Third Pressure"

[12] Claim 1(c) of the '207 patent recites these terms in the following manner:

(i) heating said core for a first period of time; (ii) applying a first pressure to said core for a second period of time such that said at least one electronic element is encapsulated by said core; (iii) cooling said core while applying a second pressure to said core.

'207 patent, col. 6:32-36.

Claim 16(c) recites:

(i) heating said core in said laminator, in the presence of a minimal first ram pressure, to a temperature which causes controlled flow of said plastic which makes up said first and second plastic core sheets; (ii) applying a second pressure uniformly across said core for encapsulating said at least one electronic element within said controlled flow plastic; (iii) sub-

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sequently cooling said core in conjunction with the concurrent application of a third pressure uniformly across said core.

207 patent, col. 8:22-32.

The issue here is whether the terms "first," "second" and "third," as used in this and other claims, refer to the sequential order in which the steps are to be performed so that, in claim 1, step (c)(i) *383 must be performed before step (c)(ii), and in claim 16, step (c)(i) must be performed before step (c)(ii), which must be performed before step (c)(iii)—or whether these words are used simply to differentiate between like elements (three different applications of pressure), without involving any sequential limitation, so that the steps can be performed in any sequential order.

It is of course well settled that "comprising" language renders a claim open-ended. Inuitrans Corp. v. Direct Mfg., 327 F.3d 1364, 1368 (Fed.Cir.2003). And in many patents, the words "first pressure," "second pressure," and "third pressure" would indicate nothing more than that there are several different levels of pressure, which readers of the patent would have to distinguish among as they parsed the patent.

[13] It is also true, however, that the terms "first," "second" and "third" can be read to denote the order of steps. See Amelco Corp. v. Microchem UK Ltd., 186 F.Supp.2d 487, 503 (D.Del.2002), *aff'd without published opinion*, 60 Fed.Appx. 800 (Fed.Cir.2003). While the terms "first," "second," and "third" are commonly used to identify separate claim elements, nothing precludes finding that the terms also specify temporal or positional relationships. *Id.* Where the language of the claim, the specification and the prosecution history logically indicate a sequential process, recited steps in a claim must be read to require a sequential order. See, e.g., Local Fairchild Corp. v. Secur. Corp., 181 F.3d 1313, 1322 (Fed.Cir.1999); ManTech Envtl. Corp. v. Hudson Envtl. Services Inc., 152 F.3d 1368, 1376 (Fed.Cir.1998).

The context of these terms in the patents in suit makes it abundantly clear that the terms are used to denote the relative order of the steps—that is, their or-

der vis-à-vis each other. Indeed, counsel for Plaintiff admitted as much at the Markman hearing. For example, in claim 1, step (c) of the 207 patent, the pressure that is applied during cooling must follow the pressure that is applied to "encapsulate" the element in plastic. In claim 16 of the same patent, the "initial ram pressure" that is applied during the process of heating the core and melting the plastic necessarily precedes the application of the "second pressure" which encapsulates the element in liquefied or partially liquefied plastic, which in turn necessarily precedes application of the "third pressure" as the hot, molten plastic cools. ^{FN10} Thus, the words "first," "second" and "third" both distinguish among three distinct steps in the claimed process and denote the order in which the three steps outlined in the claims are to be performed relative to one another.

^{FN10} Plaintiff conceded in its Markman presentation that in claim 16, step (c)(ii) must follow step (c)(i), pointing to the use of the word "subsequently" in step (c)(ii).

However, Defendant would have me go further. Oberthur argues that these terms should be construed so that "first pressure" and "first ram pressure" would be limited to "the very first pressure applied during the heat and pressure cycle." The term "second pressure" would be limited to "the next pressure applied after the first pressure during the heat and pressure cycle." And the term "third pressure" would be limited to "the next pressure applied after the second pressure during the heat and pressure cycle." (Def. Br. at 37.) Defendant's proposed construction precludes the application of any pressure prior to the application of whatever pressure is designated as "first" and the insertion of any pressure between the step involving the "first pressure" and the step involving the "second pressure." In *383 other words, Defendant argues that the words "first," "second," and "third" indicate not only the relative order of the claimed steps vis-à-vis each other, but also the absolute order in which they must be performed.

Defendant has not presented any convincing reason why the words "first," "second" and "third" as used in the cited claims must connote absolute order as opposed to relative order. Defendant's counter-ar-

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arguments based on the purported "main objective" of the patent is not persuasive; neither does the patentee's use of the phrase "highly coordinated" process indicate that "first," "second" and "third" mean "very first" and "next one after the very first," etc.

Moreover, language taken from a dependent claim strongly suggests that the words ought not to bear the limiting meaning assigned to them by Defendant. Dependent claim 18 of the 367 patent recites, "The process according to [independent] claim 1 wherein the pressure on said core in step (c)(i) is less than 10 p.s.i." Step (c)(i) in claim 1 recited beating the core for "a first period of time." It is not until step (c)(ii) of claim 1 that "a first pressure" is applied. Indeed, in the '207 provisional application, claim 1 expressly indicated that no pressure was to be applied to the core at the beginning of the first heat cycle. (That recitation was removed from the final '207 application.) Thus, dependent claim 18 of the 367 patent narrows claim 1 by reciting an application of very light pressure (less than 10 p.s.i.) prior to the application of "a first pressure."

But Defendant argues that claim 18 does not help Leighton because the claim itself is indefinite under the "Lack of Antecedent Basis" doctrine as set forth in the Manual of Patent Examining Procedure (MPEP) § 2173.05(c).

Dependent claim 18 recites "the pressure" to be applied during a certain step (step (c)(i)) as disclosed in claim 1. Step (c)(i) in claim 1 does not mention any application of pressure. Therefore, according to Defendant, "the pressure on said core in step (c)(i)" (emphasis added), as recited in claim 18, has no antecedent, and Leighton is trying to read something into that claim that is not there.

Plaintiff responds that claim 1 and claim 18 of the 367 patent disclose two different embodiments of a single invention, and that as long as the two or three pressures disclosed in the patent claims are part of an enclosure/lamination process, that process is covered by the patent.

On reflection, I reject defendant's argument as too narrow a reading of the "lack of antecedent basis"

doctrine.

Section 2173.05(c) of the MPEP reads, in pertinent part,

A claim is indefinite when it contains words or phrases whose meaning is unclear. The lack of clarity would arise where a claim refers to "said lever" or "the lever," where the claim contains no earlier recitation or limitation of a lever and where it would be unclear as to what element the limitation was making reference...

However, the Manual goes on to read:

Obviously, however, the failure to provide explicit antecedent basis for terms does not always render a claim indefinite. If the scope of a claim would be reasonably ascertainable by those skilled in the art, then the claim is not indefinite... The totality of all the limitations of a claim and their interaction with each other must be considered to ascertain the inventor's contribution to the art.

Considering the "totality of all the limitations" of claims 1 and 18 of the 367 patent, Defendant's interpretation cannot be correct. Step (c)(ii) of claim 1 recites, *384 "applying a first pressure to said core." As noted above, "a first pressure" does not necessarily mean that no pressure was applied during a prior step. While step (c)(i) does not specifically state that pressure must be applied, it does not preclude the application of pressure, either. Dependent claim 18 is most reasonably interpreted to limit claim 1 to the situation where pressure on the core in step (c)(i), if any, is less than 10 p.s.i. And I note that "less than 10 p.s.i." of pressure encompasses no pressure whatsoever.

[14] Courts interpreting patents routinely avoid indefiniteness by interpreting language to provide for an antecedent basis. See, e.g., Astra Pharmaceuticals v. Andex Pharmaceuticals, Inc., 222 F.Supp.2d 423, 458 (S.D.N.Y.2002) (interpreting an antecedent phrase, "alkaline reacting compound," to include by definition the phrase in question, "micro-environment," in order to (i) find antecedent basis for "the micro-environment" and (ii) avoid indefiniteness for lack of antecedent basis) (emphasis added). Most particularly, in Digital Biometrics, Inc. v. Identix, Inc., [49

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Eld 1335, 1344 (Fed.Cir.1998), the Federal Circuit noted that if a claim is "susceptible to a broader and narrower meaning, and the narrower one is clearly supported by the intrinsic evidence while the broader one raises questions of enablement under [the MPBP], [the court must] adopt the narrower of the two." See also Rhine v. Casio, Inc., 193 F.3d 1342, 1345 (Fed.Cir.1999) (if a claim is susceptible to two interpretations, one of which renders it valid and the other of which renders it invalid, the claim must be construed to sustain its validity).

Outside the patent context, there are cases concluding that use of the definite article "the" particularizes the subject and narrows the possible class of possible antecedents. For example, in Freitag v. Commissioner of Internal Revenue, 501 U.S. 868, 902, 111 S.Ct. 2631, 115 L.Ed.2d 764 (1991), Justice Scalia, in a concurring opinion that did not command a majority on the Supreme Court, concluded that use of the definite article "the" in the phrase "the Courts of Law" (which appears in the Appointments Clause of the Constitution, Art. II, § 2, cl. 2) narrowed a class to specific "envisioned" members. Similarly, while engaging in statutory construction in the context of a patent case, the Federal Circuit concluded that Congress's decision to say "the use" rather than "a use" meant "a specific" use rather than a "previously undefined" use. Harman-Laubert Co. v. Apotex Corp., 316 F.3d 1348, 1356 (Fed.Cir.2003)(citing Freitag, 501 U.S. at 902, 111 S.Ct. 2631). Finally, in American Bus Association v. Slater, 231 F.3d 1, 4-5 (D.C.Cir.2000), the D.C. Circuit called the notion that the article "the" particularizes its subject "a rule of law."

But none of these pronouncements involved patent claim construction, which has its own specialized rules, the first of which is that, wherever possible, a claim is to be construed to make sense of the claim. No case has been cited to the Court, and I have found none, that applies Justice Scalia's Freitag analysis to render a patent claim indefinite. I conclude that the cases cited in the preceding paragraph are inapplicable here. **EN11**

EN11. I am bolstered in this conclusion by the fact that Oberthur did not cite these cases

in its brief. My law clerk found them while we were exploring Oberthur's argument.

Therefore, considering the "totality of the limitations," I find claim 18 has antecedent basis in claim 1, step (c) as a whole, and is not indefinite.

9. "Controlled Flow"

[15] The term "controlled flow" is construed to mean, "Regulated and directed forward continuous movement."

*305 The phrase appears in claim 16 of the '207 patent:

(i) heating said core in said laminator, in the presence of minimum first ram pressure, to a temperature which causes controlled flow of said plastic which makes up said first and second plastic core sheets; (ii) applying a second pressure uniformly across said core for encapsulating said at least one electronic element within said controlled flow.

'207 patent, col. 8:22-28. The specification states that "A heat cycle is applied to the core sheets in the laminator thus liquefying or partially liquefying the sheets." '207 patent, col. 2:34-36. The specification further describes that the purpose of the "controlled flow" is to enclose the electronic element, "Once the heat cycle has been applied to the book as is set forth above, the ram pressure of laminator is increased to facilitate the flow of the plastic core sheets so that the one or more electronic elements are encapsulated thereby..." '207 patent, col. 4:48-52.

The meaning of the phrase "controlled flow" would appear to be self-evident. When a liquid "flows" it moves forward continuously. "Controlled" indicates some degree of restraint (Plaintiff's proposed term) or regulation or direction (my preferred term).

Defendant claims the phrase means that " 'the first and second plastic core sheets' at least partially liquefy so as to fully enclose the 'electronic element' at the ram pressure and heat applied to the 'core sheets' and allow the outer surfaces of the finished card before dye sublimation printing to assume a smoothness of approximately .0005 inches or better." (Def. Br. at 41.)

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According to Defendant, "flow" is a technical term. (*Id.*) McGraw Hill defines "flow" to mean "the forward continuous movement of fluid, such as gases, vapors, or liquids, through closed or open channels or conduits." Defendant cites the language of the specifications quoted above as supporting the premise that the electronic element is fully encapsulated by the first and second plastic core sheets, which at least partially liquefy in order to "flow" and surround the electronic element. (Def. Br. at 42.) Defendant also notes that Leighton stresses in the '207 specification that his invention lies in producing a contactless card with a sufficiently smooth and regular surface to receive dye sublimation printing, and that this smoothness cannot be achieved unless the core plastic sheets at least partially liquefy and flow. (*Id.*)

I agree with Defendant to the extent that plastic, in the state we normally encounter it, would not "flow." And we know from the specifications and claims discussed above that the lamination process at issue here involves heating the plastic core sheets. So I do agree that the plastic core sheets only "flow" because they have been heated, intentionally, during lamination. However, Defendant's proposed definition of "controlled flow" attempts to introduce into the definition of that phrase concepts that are not even found in the claims—a transparent effort to limit the meaning of this phrase to one disclosed embodiment. That is not the proper function of claim construction.

10. "Cooling Said Core While Applying a Second Pressure"

[16] The phrase "cooling said core while applying a second pressure" is construed to mean, "Cooling said core during the time that a second pressure is applied."

The phrase appears in claim 1 of the '207 patent:

(i) heating said core for a first period of time; (ii) applying a first pressure to said core for a second period of time such that said at least one electronic element is encapsulated by said core; *386 (iii) cooling said core while applying a second pressure to said core.

'207 patent, col. 6:31-36.

The only dispute between the parties is the meaning

of the word "while." Plaintiff asserts that "while" means "during the time that." Defendant urges that the phrase means "that cooling starts later than, or at the same time as, applying a second pressure." (Def. Br. at 43.) In other words, Defendant asks me to conclude that the word "while" fairly implies the moment at which the process of providing the pressure starts and, in particular, to exclude from the ambit of the claims any process that involves the application of the "second pressure" before the core cooling begins, even if the cooling and the second pressure proceed simultaneously for some period of time.

Defendant's attempt to limit the claim in this way is unavailing. Webster's defines "while" to mean "during the time that"—in other words, simultaneously or concurrently. Defendant's suggestion that this word says or implies anything about the relationship between the time the cooling begins and the time the application of pressure begins makes no sense. The claim language neither says nor implies anything about whether (1) cooling starts before pressure, (2) pressure starts before cooling, or (3) they start at the same time. The claim language requires only that the cooling and second pressure be happening simultaneously, regardless of the start sequence of the cooling and the application of pressure.

At the *Markman* hearing, the parties illustrated this term with the example of taking a nap "while my roommate goes shopping." The illustration works well. Clearly, as long as roommate # 1 is napping at any point in time during roommate # 2's trip to the store—regardless of when the nap commenced—roommate # 1 would have been napping "while" roommate # 2 went shopping.

11. "Cooling Said Core in Conjunction With the Concurrent Application of a Third Pressure"

[17] Claim 16 of the '207 patent states, "(iii) subsequently cooling said core in conjunction with the concurrent application of a third pressure uniformly across said core, said core including said [sic] upper and lower surfaces." '207 patent, col. 8:29-32.

The phrase is construed to mean, "Cooling said core while at the same time applying a third pressure."

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As above, Defendant urges that the phrase "in conjunction with" fairly implies that the cooling "starts and ends at the same time a third pressure is applied." (Def. Br. at 44.) For the reasons recited above, I reject the Defendant's argument that these words suggest absolute synchronicity (though I question why the patentee could not have used the same terminology in both claims).

12. "Plastic Core Sheets"

[18] The phrase "plastic core sheets" is construed to mean, "Sheets of plastic between which the electronic element is positioned."

The phrase appears in claim 1 of the '207 patent, for example:

A process for incorporating at least one electronic element in the manufacture of a plastic card, comprising the steps of: (a) providing first and second plastic core sheets; (b) positioning said at least one electronic element in the absence of a non-electronic carrier directly between said first and second plastic core sheets to form a core, said plastic core sheets defining a pair of inner and outer surfaces of said core; (c) positioning said core in a laminator apparatus, and subjecting"387 said core to a heat and pressure cycle.

'207 patent, col. 6:18-29. See also '099 patent, col. 5:13-17.

Defendant does not address this term.

Plaintiff asks me to construe the phrase, but urges that the meaning of the phrase is clear from the wording of the subject claims. (Pl. Br. at 17.) I agree.

13. "Laminator Apparatus"

[19] The phrase "laminator apparatus" is construed to mean, "Equipment that is used to unite two or more layers of material, such as the core, by the application of heat and pressure."

The specification of the '207 patent notes that the laminator apparatus is used for "the manufacture of plastic cards including at least one electronic element therein." '207 patent, col. 2:16-20, and that it is used to unite the plastic core sheets and the electronic ele-

ment, col. 4:22-5:5.

Plaintiff proposes that the specifications and the prosecution histories of the Patents indicate that a "laminator apparatus" is "equipment that is used to unite two or more layers of material, such as the core, by the application of heat and pressure." (Pl. Br. at 23-24.) Defendant does not object, so I adopt Plaintiff's definition. (Pl. Br. at 23-24.)

14. "Milling"

[20] "Milling" is construed to mean, "using a machine to remove."

Claim 1 of the '099 patent recites a step of "milling a region of said core to a controlled depth so as to form a cavity which exposes at least one contact pad of said electronic element." '099 patent, col. 9:3-5. Claims 1 and 22 of the '367 patent recite virtually identical steps.

Plaintiff proposes that the ordinary meaning of the word milling, from the Dictionary of Composite Materials, p. 91, is "[a] machining process for removal of material." (Pl. Br. at 25.) The specifications are consistent with this construction, stating that each card undergoes a controlled-depth milling operation to form a window or cavity. '099 patent, col. 8:1-6. Defendant does not object, so I adopt Plaintiff's definition.

Conclusion

For the foregoing reasons, the disputed terms are construed in the manner noted above.

This constitutes the decision and order of the court.

S.D.N.Y., 2005.
 Leighton Technologies LLC v. Oberthur Card Systems, S.A.
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Briefs and Other Related Documents (Back to top)

- [2006 WL 2482010](#) (Trial Pleading) Amended Answer to Counterclaims, Affirmative Defenses (Aug. 11, 2006) Original Image of this Document (PDF)
- [2006 WL 2582009](#) (Trial Pleading) Answer to

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Third Amended Complaint, Affirmative Defenses and Counterclaims (Aug. 9, 2006) Original Image of this Document (PDF)

• [2006 WL 2426501](#) (Trial Pleading) Third Amended Complaint (Jul. 27, 2006) Original Image of this Document (PDF)

• [2006 WL 1416590](#) (Trial Motion, Memorandum and Affidavit) Plaintiff Leighton Technologies' Memorandum in Opposition to Defendant's Request to Set Aside Magistrate Smith's March 27, 2006 Order (Apr. 20, 2006) Original Image of this Document with Appendix (PDF)

• [2006 WL 1416588](#) (Trial Motion, Memorandum and Affidavit) Oberthur Card Systems, S.A. Memorandum in Support of Objections to the Magistrate Judge's Order Pursuant to Fed. R. Civ. P. 72(a) (Apr. 7, 2006) Original Image of this Document (PDF)

• [2006 WL 551391](#) (Trial Motion, Memorandum and Affidavit) Oberthur Card Systems, S.A.'s Reply Memorandum in Support of Motion for Summary Judgment of Patent Invalidity (Jan. 5, 2006) Original Image of this Document (PDF)

• [2005 WL 3647762](#) (Trial Pleading) Answer to Second Amended Complaint, Affirmative Defenses and Counterclaims (Nov. 10, 2005)

• [2005 WL 3280983](#) (Trial Pleading) Second Amended Complaint (Oct. 25, 2005)

• [2005 WL 3784592](#) (Trial Motion, Memorandum and Affidavit) Memorandum in Support of Motion for Summary Judgment of Patent Invalidity (Oct. 18, 2005) Original Image of this Document (PDF)

• [2005 WL 3280977](#) (Trial Pleading) First Amended Complaint (Oct. 5, 2005) Original Image of this Document (PDF)

• [2004 WL 3567792](#) (Trial Motion, Memorandum and Affidavit) Oberthur Card Systems, S.A. Markman Reply Brief (Nov. 29, 2004) Original Image of this Document (PDF)

• [2004 WL 3567788](#) (Trial Motion, Memorandum and Affidavit) Plaintiff's Brief in Support of its Claim Construction (Nov. 5, 2004) Original Image of this Document (PDF)

• [2004 WL 3567790](#) (Trial Motion, Memorandum and Affidavit) Plaintiff's Brief in Support of its Claim Construction (Nov. 5, 2004) Original Image of this Document with Appendix (PDF)

• [2004 WL 3567787](#) (Trial Pleading) Answer and

Counterclaims (Jul. 9, 2004)

• [2004 WL 3636772](#) (Trial Pleading) Complaint (May 30, 2004) Original Image of this Document (PDF)

• [2004cv02496](#) (Docket) (Mar. 30, 2004)

• [2004 WL 3567789](#) (Trial Motion, Memorandum and Affidavit) Oberthur Card Systems, S.A. Markman Brief (2004)

• [2004 WL 3567791](#) (Trial Motion, Memorandum and Affidavit) Plaintiff's Brief in Support of its Claim Construction (2004)

• [2004 WL 3567792](#) (Trial Motion, Memorandum and Affidavit) Plaintiff's Brief in Opposition to Defendant's Markman Brief (2004) Original Image of this Document with Appendix (PDF)

• [2004 WL 3814972](#) (Trial Motion, Memorandum and Affidavit) Oberthur Card Systems, S.A.'s Reply Memorandum in Support of Motion for Summary Judgment of Objections to the Magistrate Judge's Order Pursuant to Fed. R. Civ. P. 72(a) (2004) Original Image of this Document (PDF)

END OF DOCUMENT

EXHIBIT 16

**EXHIBIT 16 IS BEING FILED UNDER SEAL
PURSUANT TO THE PROTECTIVE ORDER
ENTERED IN THIS CASE ON AUGUST 20, 2004
BECAUSE IT CONTAINS CONFIDENTIAL INFORMATION**

EXHIBIT 17

Keith R. Leighton

2517 Palmer Road
Lorain, Ohio 44053

Phone: 440-560-1697

OBJECTIVE: Printing/Technical Consultant

Trouble shoot and solve technical problems leading to superior product quality by contributing proven ability to:

- Analyze, research and correct chemical/mechanical deficiencies.
- Experienced with, invent and recommend innovative lithographic process.
- Diagnose problems, organize and supervise production improvements.
- Formulate, test and print on difficult substrates.

QUALIFICATIONS:

A knowledgeable innovative professional offering 46 years progressive experience encompassing:

- | | | |
|---------------------------|-------------------|---------------------|
| • Plastic Cards/Novelties | • Press Mechanics | • Ink Chemistry |
| • Commercial Printing | • Laminating | • Press Chemistry |
| • Specialized Printing | • Pre-press | • Sheet/Web Presses |

Journeyman Printer for 31 years with training and experience in all phases of the lithographic trade.

ACHIEVEMENTS:

Invented Radio Frequency Identification Devices (RFID) using self developed Hot Lamination Method. One patent issued, one allowed, and two pending.

Invented process and method for printing on PVC/Unlaminated Plastic identification devices on a web press, whereby three people can achieve a per-hour production rate of 100,000 completed pieces.

Solved printing problems related to plastic financial bank cards, restoring five major customers with total annual sales in excess of \$500mm.

Managed plant turnaround by rebuilding laminator, installing pneumatic air peddle on gullotine cutter and developing wet offset method for printing on plastic cards, saving company and jobs of thirty employees.

Invented vacuum-backed plate bender, that eliminated distorted plate register and is used universally throughout web press industry.

Recommended higher quality plate material, changed ink and press chemistry and completely over-hauled web press, improving quality of printing, decreasing labor costs and reducing paper waste, and saving over \$200K annually.



Keth R. Leighton

Page 2

EXPERIENCE:

Research and Development, Invented hot lamination process to manufacture various smart cards. One patent issued and one patent allowed by U.S. Patent Office. Two patents pending. 1996 - 1999

Technical Consultant, Motorola/Indala, San Jose, California
Developed a plastic Radio Frequency Identification card. 1995

Technical Consultant, Plastag, Inc., Chicago, Illinois
Developed ultra violet printing inks for ISO standard lamination process. 1995

Technical Consultant, Columbus Carton, Columbus, Ohio
Replaced ink rollers and established printing pressure for printing on a Miehle Flat Bed Letter Press. 1995

Technical Consultant, Laminex D & K, Charlotte, North Carolina and Data Code, Solon, Ohio
Developed plan to establish a plastic card manufacturing plant. 1995

Technical Consultant, Rainbow Printing, Uniontown, Ohio
Developed new state-of-the-art ultra-violet printing system which increased card production and reduced operating expenses. 1991 - present

Technical Consultant/Printing Manager, Cardtech, Twinsburg, Ohio
Managed printing processes, assuring close tolerances and quality control needed for the production of VISA and MasterCard. 1990 - 1991

Pressman Foreman/Pressman, Bowne of Detroit, Detroit, Michigan
Financial/Legal printer supervising five employees. 1985 - 1990

Plant Manager, Harland Press and Mulford Printing, Warren, Michigan
Managed fifty employees in a printing, die cutting and bindery operation. 1983 - 1985

Owner/Operator, Royal Chambers, Inc., Birmingham, Michigan
Leased and maintained 24 furnished apartments. 1981 - 1983

Production Manager, CSN (formerly ZB Systems Corp.), Madison Heights, Michigan
Managed thirty employees and was responsible for total plant operations and maintenance. 1970 - 1981

Pressman/Color Proofer, General Motors Photographix, Detroit, Michigan
Printing, color proofing and production on sheet fed and web press machines. A progression for Plate Maker/Engraver. 1953 - 1970

Keith R. Leighton

Page 2

EXPERIENCE:

Technical Consultant, Motorola/Indala, San Jose, California
Developed a plastic Radio Frequency Identification card. 1995

Technical Consultant, Plexig, Inc., Chicago, Illinois
Developed ultra violet printing inks for ISO standard lamination process. 1993

Technical Consultant, Columbus Canon, Columbus, Ohio
Replaced ink rollers and established printing pressure for printing on a Minho Flat Bed Letter Press. 1995

Technical Consultant, Laminex B & K, Charlotte, North Carolina and Data Code, Solon, Ohio
Developed plan to establish a plastic card manufacturing plant. 1993

Technical Consultant, Rainbow Printing, Uniontown, Ohio
Developed new state-of-the-art ultra-violet printing system which increased card production and reduced operating expense. 1991 - present

Technical Consultant/Printing Manager, Cardtech, Tinsburg, Ohio
Managed printing processes, assuring close tolerances and quality control needed for the production of VISA and MasterCard. 1990 - 1991

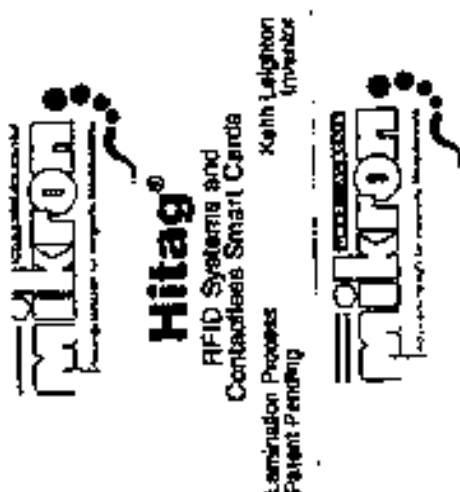
Pressman/Pressman, Bonar of Detroit, Detroit, Michigan
Financial/Legal printer supervising five employees. 1985 - 1990

Plant Manager, Harland Press and Milford Printing, Warren, Michigan
Managed fifty employees in a printing, die cutting and bindery operation. 1982 - 1983

Owner/Operator, Royal Chambers, Inc., Birmingham, Michigan
Leased and furnished 24 furnished apartments. 1981 - 1983

Production Manager, CSI (formerly B Systems Corp.), Madison Heights, Michigan
Managed thirty employees and was responsible for total plant operations and maintenance. 1970 - 1981

Pressman/Color Proofer, General Motors Photographic, Detroit, Michigan
Printing, color proofing and production on sheet fed and web press machines. A progression for Plate Maker/Engraver. 1953 - 1970



Motorola, Indala
Keith Leighton Consultant
sued



(949) 980-3587
Keith Leighton
Technical Consultant
lamination process



Trial Counsel's Eyes Only

L11023

EXHIBIT 18

80728 5/18/2006

Page 1

1 IN THE UNITED STATES DISTRICT COURT
2 FOR THE SOUTHERN DISTRICT OF NEW YORK
3
4

5 LEIGHTON TECHNOLOGIES, :

6 Plaintiffs, :

7 vs. :

No. 04-CV-02496
:
:
8

OBERTHUR CARD SYSTEMS, S.A., :

9 OBERTHUR CARD SYSTEMS OF :

10 AMERICA CORPORATION, :

Defendants. :

11
12 --oOo--
13

14 VIDEOTAPE DEPOSITION OF
15 KEN THOMPSON
16 VOLUME I
17

18 May 4, 2006
19

20 REPORTED BY: KENNETH T. BRILL, RPR, CSR 12797
21
22

23 ELLEN GRAUER COURT REPORTING CO. LLC
126 East 56th Street, Fifth Floor
24 New York, New York 10022
212-750-6434
25 REF: 80728

1 THOMPSON

2 BY MR. J. D. JACOBS:

3 Q. Let's look over to the left. There is --
4 what is the first drawing at the top on the left
5 side of the page?

6 A. I think the top left drawing to me looks
7 like a sheet and is showing the RFID coil and module
8 sitting on top of the sheet, or the location of a
9 coil within a sheet.

10 Q. Mm-hmm.

11 A. I'm not sure.

12 Q. And what does the drawing underneath that
13 one indicate?

14 A. The drawing underneath it looks like it's
15 either a single card or a sheet which says that a
16 requirement for the surface of the card/sheet is
17 that it be shiny, smooth, and surface imperfections
18 of plus or minus five thousandths of an inch, so
19 that would be plus or minus -- not five
20 thousandths -- five ten thousandths of an inch. So
21 it would be plus or minus half a mil.

22 Q. Whose requirement was shiny, smooth and
23 plus or minus five ten thousandths of an inch?

24 A. It was Indala's requirement. We -- we
25 felt that for dye sublimation card printers, they

THOMPSON

1
2 need a smooth surface, a shiny surface. In other
3 words what we call a press polish, a polished
4 surface, similar to a credit card finish. And it
5 needed to be smooth, so free of surface
6 perturbations. We felt the magic number was half a
7 mil, or five ten thousandths of an inch of surface
8 perturbations, in order to achieve successful
9 printing with a dye sublimation printer.

10 Q. And is -- is that a specification that you
11 had before Mr. Leighton came to Indala?

12 A. Oh, yeah. Yes.

13 As far as I recall, Mr. Leighton was not
14 familiar with dye sublimation printers when he came.

15 Q. Was Mr. Leighton familiar with embedding
16 antennas into plastic laminated cards when he came?

17 A. No, Mr. Leighton had -- had no experience
18 with that whatsoever. There is -- very few people
19 in the world had experience with it.

20 Q. Did Mr. Leighton have any experience with
21 embedding antennas, coils --

22 A. No.

23 Q. -- in plastic laminated cards?

24 MR. B. JACOBS: Object to form. This
25 witness has no idea the full scope of experience

1 THOMPSON

2 Mr. Leighton had. You know those questions are
3 objectionable.

4 BY MR. J. D. JACOBS:

5 Q. Did you learn during your meeting with
6 Mr. Leighton that we've been discussing, the first
7 meeting, what Mr. Leighton's experience was?

8 A. Yes.

9 Q. And as a result of learning of
10 Mr. Leighton's experience, did you learn that, in
11 fact, he had no experience in embedding coils in
12 plastic laminated cards?

13 MR. B. JACOBS: Object to form. The
14 witness didn't learn all of Mr. Leighton's
15 experiences.

16 BY MR. J. D. JACOBS:

17 Q. You can answer.

18 A. From -- from discussions with
19 Mr. Leighton, he had experience in the printing
20 industry for cards, and the card manufacturing
21 industry. He had no experience with electronics
22 inside of cards at all.

23 Q. Let's look at the last two items on the
24 second page, very quickly, because we're running out
25 of tape here.